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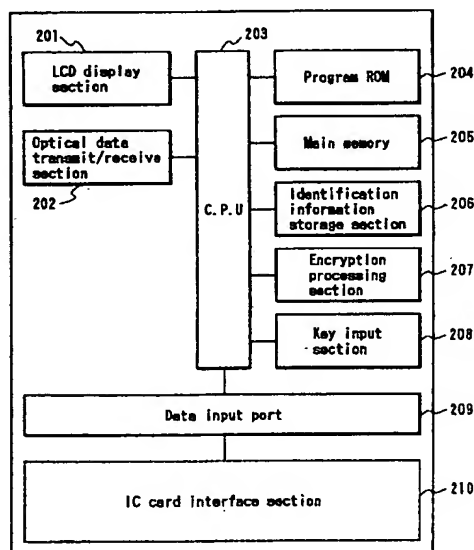
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### (54) An interactive television system

(57) An interactive television system which can provide services such as entertainment programs to users or conduct electronic polls of users, formed of a central computer installation, a plurality of terminal apparatuses each bidirectionally communicating with the central computer installation via a CATV network and each providing video/audio inputs to a display apparatus, with each of the terminal apparatuses being linked to one or more remote control apparatuses whereby users can request services or participate in polling, and in which any message data such as a service request which is issued by a remote control apparatus is automatically accompanied by identifier information, read out from a memory (206) of the remote control apparatus, for identifying that remote control apparatus, and may also be accompanied by personal information concerning a registered user of the remote control apparatus. User recognition can be implemented by an arrangement such as a plug-in IC card interface section (210) or fingerprint recognition section, for enabling restriction of each remote control apparatus to use by only a specific registered user, or to enable only a specific registered user to access certain services.

FIG. 17



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apparatuses used in prior types of interactive television system, since the remote control apparatuses do not have a bidirectional communication function which can send information from the system to specifically identified remote control apparatuses, to be displayed thereby.

A fourth problem arises with regard to storing personal attribute information of users of an interactive television system (in the following, the term "personal attribute information" will be used in a very general sense, to signify any information relating to a user, such as age, sex, home address, telephone number, etc.). In some applications, for example in order to be able to effectively interpret the results of a survey which is performed by electronic polling using an interactive television system, is desirable to have some personal attribute information available at the center apparatus. In that way it becomes possible for example to separately totalize polling results in various different categories of users, e.g. categorized in terms of age, in terms of area of residence, etc. However if comprehensive personal attribute information of users is held stored in a database at the center apparatus, then such personal information will be constantly available to any individuals who have access to the database at the center apparatus. Thus, there is a danger of violation of user privacy.

In addition, if comprehensive personal attribute information of the users held stored in that way, the problem arises that it becomes difficult to ensure that such information is kept continuously up-to-date.

As a further problem, the greater the number of users, the greater will become the amount of such personal attribute information that must be held stored at the center apparatus, so that an excessive information storage load may become concentrated on the center apparatus.

Furthermore even if such comprehensive personal attribute information were to be held stored by the center apparatus, it would be difficult to effectively use such information in evaluating the results of polling, e.g. for totalizing the results of a survey within each of a number of different categories of user. In order to achieve such a function it would be necessary to ensure that each user, when sending a polling response via telephone as described above, also accurately identifies herself/himself, i.e. so that the polling response can be linked to a corresponding set of personal attribute information for that user which is held stored at the center apparatus.

Yet another problem is as follows. If users who are not actually eligible to participate in the polling are permitted to take part, then the polling results may not provide the desired information (for example, information concerning the opinions of a certain specific category of the users). Moreover, if such non-eligible user participation occurs to any substantial extent, then the overall level of communication traffic between the center apparatus and the various terminal apparatuses of the sys-

tem will be increased. In the prior art, it has not been possible to ensure that only responses from eligible users will be accepted by the system.

Furthermore, in the prior art when an interactive television system is used as an electronic polling system, management of the polling responses is executed only only at the center apparatus. As a result, the problem arises that there may be an excessive load placed on the data-processing functions of the center apparatus, particularly during those times when responses to a poll are being received.

A further problem is as follows. For practical reasons, when conducting polling by using an interactive television system as an electronic polling system, it is necessary to set a time limit within which users must respond to polling request data which are sent from the center apparatus to the various terminal apparatuses (where the term "polling request data" as is used herein in the general sense of signifying data expressing the question or questions which the users will be asked to respond to). If for some reason a user does not respond immediately to that polling request data, then it is possible that the user will not notice or will forget the time limit that has been set for responding to the poll. This may result in the loss of the right to take part in the polling, for some users, and may cause a reduction of the total number of valid polling responses that are obtained.

Yet another problem of the prior art, when using an interactive television system as an electronic polling system, is that it has not been possible to ensure the validity of polling responses which are sent from the remote control apparatuses. Specifically, it has not been possible to ensure that polling responses are received by the center apparatus only from individuals who satisfy certain predetermined conditions.

In addition to the above, there is a basic disadvantage of such a prior art system, in that (for example, in a typical household) although there may be a plurality of users who utilize the same terminal apparatus, by operating respective ones of a plurality of remote control apparatuses, it has only been possible to obtain a single response to a polling request from each terminal apparatus. This is due to the fact that, in the prior art, it has not been possible for the system to separately identify respective responses that are sent from the various different remote control apparatuses of a terminal apparatus.

As well as such problems which have arisen in the prior art with respect to the use of an interactive television system as an electronic polling system, various other problems occur with respect to use of the remote control apparatuses by users for requesting services to be sent to a terminal apparatus from the center apparatus. For example, there may be certain data (e.g. relating to a specific terminal apparatus) such as initial setting data, which should only be accessible (for the purpose of changing the data contents) by a certain authorized user or by a specific group of users. However in the prior art, even where changing of such data can

users on demand, whereby it becomes unnecessary for a user to execute repetitive data input operations in relation to successive displayed menu pages, in order to locate a desired service within a large number of services which are available from the interactive television system and to input to the system a request for such a desired service.

The present invention provides an interactive television system formed of a center apparatus, a plurality of terminal apparatuses which can perform bidirectional communication with the center apparatus via a data communication network capable of transmitting video data, such as a CATV network, whereby it is a basic feature of the present invention that each remote control apparatus is assigned an identifier, e.g. an identifier number, and each terminal apparatus is also assigned an identifier, enabling the center apparatus to identify a remote control apparatus which originates a request for a service or sends a polling response, and whereby the center apparatus can send appropriate service data to the terminal apparatus corresponding to the originating remote control apparatus or can send messages directed to the users of specific remote control apparatuses. In the following description and in the appended claims, the term "message data set" will be used as a general term to refer to a data set which is sent from a remote control apparatus to a terminal apparatus or from a terminal apparatus to the center apparatus, consisting of (at least) polling request data with the identifier of the originating remote control apparatus attached thereto, or consisting of service request data with the identifier of the originating remote control apparatus attached thereto.

Preferably, the identifiers assigned to the remote control apparatuses and to the terminal apparatuses are respectively unique within the system, while the center apparatus holds information which relates the remote control apparatus identifiers to their respective terminal apparatus identifiers. In that case, it is unnecessary for the terminal apparatus identifier to be attached to data which are sent from a remote control apparatus via its terminal apparatus to the center apparatus. However the center apparatus must store information relating each remote control apparatus identifier to the identifier of the corresponding terminal apparatus. Such an arrangement is assumed in the various embodiments of the invention described hereinafter. However that is not essential, and it would be equally possible to ensure only that the terminal apparatus identifiers are unique within the system, and to arrange that when data are sent from a remote control apparatus via its terminal apparatus to the center apparatus, both the remote control apparatus identifier and terminal apparatus identifier are attached. In that case, it becomes unnecessary for the center apparatus to store the aforementioned relationships between remote control apparatus identifiers and terminal apparatus identifiers, but it would be necessary for the center apparatus to receive, attached to each message data set (i.e. a polling response data set

or a service request data set) received from a terminal apparatus, both the remote control apparatus identifier and the terminal apparatus identifier, so that the center apparatus can send appropriately addressed data in response to that message data set.

Since the remote control apparatus identifier is always attached to message data which are sent by a user to the center apparatus, then if it can be assumed that each remote control apparatus will only be used by a specific user, or by one of a specific category of users, the center apparatus can identify each user who originates such message data, or can ascertain that the user falls within a predetermined category. However it is possible that an remote control apparatus may be usable by a plurality of different user, so that such identification is not reliable. For that reason, according to another aspect of the present invention, each remote control apparatus can be provided with user identification means. Such means can include key input means for a user to input a predetermined code or password, and means for recognizing that code or password. Alternatively, each remote control apparatus can be provided with fingerprint recognition means, or voice pattern recognition means, and can store data for use in identifying fingerprint or voice pattern of a registered user.

Each remote control apparatus can also include means for storing personal information relating to a registered user, and means for attaching that information to message data which is input by the user, to be sent to the center apparatus, while no such personal information are sent to the center apparatus when message data are input by some other user, i.e. a non-authorized user. Alternatively, it can be arranged that message data which are input by a user can only be sent from the remote control apparatus to the center apparatus if the user has been recognized by the aforementioned identification means.

More specifically, according to a first basic aspect, the invention provides an interactive television system comprising a center apparatus, a plurality of terminal apparatuses, a plurality of display apparatus and a plurality of remote control apparatuses, the terminal apparatuses being respectively configured for bidirectional data communication with the center apparatus via a digital data communication network and each configured for receiving data by a wireless communication link from at least a corresponding one of the remote control apparatuses and for supplying to a corresponding one of the display apparatuses, data sent thereto from the center apparatus;

wherein

each remote control apparatus comprises means for input of message data by a user, means for storing a predetermined remote control apparatus identifier, means for reading out and attaching at least the remote control apparatus identifier to the user message data to form a message data set, and means for sending the message data set via the wireless communication link to the terminal apparatus,

response to the displayed polling request data, means for reading out the remote control apparatus identifier, attaching the remote control apparatus identifier and the extracted personal attribute information items to the polling response data to form a message data set, and means for sending the message data set to the corresponding terminal apparatus, and

each terminal apparatus comprises means for reading out the polling eligibility conditions data, extracting the personal attribute information items from the message data set, comparing the extracted personal attribute information items with the polling eligibility conditions data to judge the eligibility of the user to participate in the poll, and means for sending the message data set via the communication network to the center apparatus when the user is thereby judged to be eligible;

the center apparatus further comprising means for extracting the remote control identifier, the personal attribute information items and polling response data from each message data set which is received thereby, means for storing the remote control identifiers, and means for storing the personal attribute information and polling response data of respective users in a predetermined relational manner, means for analyzing the personal attribute information and polling response data obtained from a plurality of users to thereby obtain polling result data, and means for sending the polling result data via the data communication network to the terminal apparatuses.

With such a system, the center apparatus may also comprise means for comparing each remote control apparatus identifier of a received message data set with respective remote control apparatus identifiers which have been previously received and stored, for thereby detecting reception of multiple responses from any of the remote control apparatuses, and means for inhibiting use of the polling response data an personal attribute information contained in the message data set in deriving the polling result data.

Furthermore such a system can be configured wherein the wireless communication link which connects each remote control apparatus to a terminal apparatus is a bidirectional data communication link, wherein each remote control apparatus comprises data display means, and wherein the center apparatus comprises means responsive to the detection of multiple responses from a remote control apparatus for generating data of a warning message, attaching the warning message data to the identifier of the remote control apparatus to form a warning message data set and for sending the warning message data set via the data communication network to the terminal apparatus having a terminal apparatus identifier which corresponds to the remote control apparatus identifier of the remote control apparatus, and

wherein each terminal apparatus comprises means responsive to receiving a warning message data set for extracting the remote control apparatus identifier

therefrom and sending the warning message data to the corresponding remote control apparatus, to be displayed by the data display means of the remote control apparatus.

Alternatively, such a system can be configured whereby each terminal apparatus further comprises means for measuring, for each of the corresponding remote control apparatuses, an elapsed time amount which occurs from a commencement of the displaying of the polling request data until a message data set containing the polling response data is received from the remote control apparatus, and means for sending the elapsed time amounts in conjunction with respectively corresponding remote control apparatus identifiers, as resultant data, to the center apparatus via the data communication network, with the center apparatus further comprising means for analyzing the resultant data received from the terminal apparatuses to obtain, as polling result data, data relating the remote control apparatus identifier to successively increasing values of the elapsed time amounts, and means for sending the polling result data to the terminal apparatuses.

According to another basic aspect, the invention provides such an interactive television system, but wherein the center apparatus includes means for selectively providing data of a plurality of services, each of the terminal apparatuses being configured for supplying, to the corresponding one of the display apparatus, service data which are sent thereto from the center apparatus;

wherein each remote control apparatus comprises

means operable by a user for inputting service request data to request a specific one of the services,

means for storing a predetermined remote control apparatus identifier,

means for storing predetermined user-specifying data which is specific to an individual user,

means for storing a predetermined user identifier which is specific to the individual user,

means for input of user-specifying data by a user,

means for comparing the input user-specifying data with the stored user-specifying data to achieve recognition of the specific individual user,

means functioning when the recognition has been achieved, in response to input of the service request data, for reading out the user identifier and the remote control apparatus identifier and for

attaching the the user identifier and the remote control apparatus identifier to the service request data to form a message data set, and functioning, when the recognition has not been achieved, to attach the remote control apparatus identifier to the service request data to form a message data set, and

means for sending the message data set via the wireless communication link to the terminal apparatus;

identifier contained in a received message data set, whether a service specified by the service request data of the message data set is a restricted service which is available to the user of the remote control apparatus having the remote control apparatus identifier, or is a service which is available to all users, and

means functioning when it is judged that the service specified by the service request data of a message data set is available to the user, for providing the corresponding service data and sending the service data via the network to the terminal apparatus having a terminal apparatus identifier corresponding to the remote control apparatus identifier which is contained in the received message data set.

The present invention will be further described hereinafter with reference to the following description of exemplary embodiments and the accompanying drawings, in which:

Fig. 1 is a conceptual system block diagram for illustrating the basic structure of an interactive television system according to the present invention;

Fig. 2 shows the basic elements of an interactive television system according to the present invention;

Figs. 3A, 3B constitute a basic system block diagram of an example of an interactive television system according to the present invention, conceptually illustrating internal functions of a center apparatus, a terminal apparatus and a remote control apparatus;

Fig. 4 is a table showing an example of the contents of a personal attribute information list, sent to remote control apparatuses attached to polling request data with a first embodiment of the invention;

Fig. 5 is a table showing an example of part of the contents of a list of personal attribute information items of users, held stored at a center apparatus of the first embodiment;

Fig. 6 shows an example of the contents of a polling request data set, sent to each terminal apparatus from the center apparatus, when executing polling with the first embodiment;

Fig. 7 shows an example of the contents of a polling response data set, sent by each of respective remote control apparatuses to the corresponding terminal apparatus, during polling with the first embodiment;

Fig. 8 is an example of polling results obtained with the first embodiment, whereby the results are respectively totaled for different categories of users;

Figs. 9A, 9B constitute a flow diagram showing an example of the processing executed by the center apparatus of the first embodiment, whereby a polling request data set specifying polling eligibility

conditions, personal attribute information list, and polling request data is sent to each terminal apparatus from the center apparatus;

Figs. 10A, 10B constitute a flow diagram showing an example of the processing executed by a terminal apparatus of the first embodiment, in correspondence with the processing of Figs. 9A, 9B;

Figs. 11A, 11B constitute a flow diagram showing an example of the processing executed by a remote control apparatus of the first embodiment, in correspondence with the processing of Figs. 9A, 9B and 10A, 10B;

Fig. 12 is a basic system block diagram of an interactive television system according to a second embodiment of the present invention, whereby polling results are determined on the basis of polling response times of users, conceptually illustrating part of the internal functions of a center apparatus, a terminal apparatus and a remote control apparatus;

Fig. 13 is a table showing an example of polling results obtained with the second embodiment;

Fig. 14 is a flow diagram showing an example of the processing executed by the center apparatus of the second embodiment;

Figs. 15A, 15B constitute a flow diagram showing an example of the processing executed by a terminal apparatus of the second embodiment, in correspondence with the processing of Fig. 14;

Fig. 16 is a flow diagram showing an example of the processing executed by a remote control apparatus of the second embodiment, in correspondence with the processing of Figs. 14 and 15A, 15B;

Fig. 17 is a system block diagram showing an example of the basic configuration of a remote control apparatus for use in an interactive television system according to a third embodiment of the invention, whereby user recognition by a remote control apparatus is performed by use of a plug-in IC card;

Figs. 18A, 18B constitute a basic system block diagram of an example of an interactive television system according to the third embodiment, conceptually illustrating internal functions of a center apparatus, a terminal apparatus and a remote control apparatus;

Figs. 19 and 20 show alternative arrangements for achieving user recognition by the remote control apparatus of Fig. 17, whereby recognition is performed based on fingerprint patterns and on voice patterns, respectively;

Fig. 21 is a flow diagram showing an example of the operation of a remote control apparatus of an interactive television system according to the third embodiment;

Fig. 22 is a flow diagram showing an example of the processing executed by a terminal apparatus of the third embodiment, in correspondence with the processing of Fig. 21;

munication network such as a CATV (cable television) network to respective terminal apparatuses. The term "terminal apparatus" as used in the following is to be understood as signifying a computer installation which uses the aforementioned communication protocol for bidirectional communication with the center apparatus via the CATV network, and which also implements bidirectional communication (in general, via a wireless optical link) with each of a set of one or more remote control apparatuses. The terminal apparatus may for example implement the aforementioned communication protocol by means of program routines stored in a ROM (Read only Memory), or may operate by executing computer programs which has been sent from the center apparatus and stored in memory. 103 denotes a display apparatus which generates a video display picture, based on video data or a video signal that is output from the terminal apparatus 102. 104, 105 and 106 denote respective remote control apparatuses, for use by respective users of the system.

Basic features of the present invention are:

- (a) Each remote control apparatus is assigned an identifier, e.g. an identification number, which is unique within the system.
- (b) Each terminal apparatus is assigned an identifier, which again may be an identification number, that is unique within the system.
- (c) The center apparatus holds information stored in memory, e.g. in the form of a table, which relates each of the remote control apparatus identifiers to the identifier of the terminal apparatus which corresponds to that remote control apparatus, i.e. the terminal apparatus to which that remote control apparatus is connected by a wireless data communication link. Furthermore in the case of this embodiment, it is an essential feature that each of the remote control apparatuses can store personal attribute information of a specific user, i.e. each remote control apparatus is assigned to a specific user.

The users obtain information that is sent from the center apparatus 101 by observing the display apparatus 103, and operate the remote control apparatuses 104, 105, 106 accordingly, to send data to the terminal apparatus 102. Resultant processing is executed by the terminal apparatus 102, and data are sent to the center apparatus 101. Polling results are sent by the center apparatus 101 via the terminal apparatus 102 to the remote control apparatuses 104, 105, 106.

The basic physical configuration of such a system is conceptually illustrated in Fig. 2. Here, the center apparatus 101 communicates via a CATV network 100 with a plurality of terminal apparatuses, one of which is designated as terminal apparatus 102. The terminal apparatus 102 supplies data (e.g. in the form of a video signal, or data which can be converted to a video signal by circuits in the display apparatus 103) to the display

apparatus 103. As indicated, each of the remote control apparatuses which communicate with the terminal apparatus 102 can be provided with a set of data input keys 107, such as a numeric or alphanumeric key pad, whereby users can input data such as requests for services or responses to polling requests, to the system.

A specific first embodiment of the present invention, for the case in which the invention is applied to an electronic polling system, will be described in the following. Figs. 3A, 3B (collectively referred to in the following simply as Fig. 3) show the configuration of this embodiment in the form of a basic block system diagram, showing the center apparatus of the system, one of the terminal apparatuses of the system, and one of the remote control apparatuses which is linked to that terminal apparatus. It should be understood that the various system blocks which are shown as performing specific functions in the the center apparatus, terminal apparatus and remote control apparatus in Fig. 3 are to taken as purely conceptual, since the respective operating functions are actually performed by computer program operations. For example, an "I/O interface section" of a terminal apparatus, for executing data communication via a network will in practice be implemented by computer program routines, stored in memory, which are invoked and executed when necessary for implementing a specific data communication protocol to send or receive data from or to the center apparatus. In Fig. 3, 2100 denotes a center apparatus, 2101 denotes a central processing unit which executes processing of programs for the center apparatus. 2102 denotes a monitoring section which monitors the polling contents. 2103 denotes a polling conditions management section which manages conditions that define polling eligibility. 2104 denotes an attribute automatic totalizing section which executes data totalization based on personal attribute information which is attached to the polling response data. 2105 denotes a data base section, which stores personal attribute information of users, polling data, etc. 2106 denotes a network interface to a digital CATV network.

2200 denotes a terminal apparatus. 2201 denotes a central processing unit which executes processing of programs for the terminal apparatus. 2202 denotes a network interface section to the digital CATV network. 2203 denotes an I/O interface section, for executing communication with the remote control apparatuses, via respective wireless data communication links such as optical data communication links. 2204 denotes a main memory for storing information. 2205 denotes a non-volatile data storage section, for storing attributes of the terminal apparatus. 2206 is a polling schedule management section for managing polling validity times, response time limits, etc. 2207 denotes a polling management section, for checking the polling conditions.

2300 denotes a remote control apparatus. 2301 denotes a central processing unit for executing processing of programs relating to the remote control apparatus. 2302 denotes an I/O (input/output) interface section for executing communication with the terminal appa-

section 2305, to thereby generate a set of data which will be referred to as a polling response data set. That data set is sent via the I/O interface sections 2302 and 2203 to the terminal apparatus 2200. Fig. 7 shows an example of such a polling response data set.

If the user does not input a polling response, then when the time limit of the polling validity term becomes close, a message indicating that polling will soon be ended is supplied by the terminal apparatus to be displayed by the display apparatus 2400.

When a polling response data set is received by the terminal apparatus, the polling management section 2207 checks the contents, and if the polling eligibility conditions are satisfied, the terminal apparatus 2200 sends the polling response data set to the center apparatus, or temporarily stores the polling response data set, to subsequently send all received polling response data sets to the center apparatus. When the end of the polling term is reached (or when responses have been received from all of the remote control apparatuses which are linked to that terminal apparatus), the terminal apparatus sends all of the polling response data sets to the center apparatus, and deletes the polling term data which have been stored in the polling schedule management section 2206. Alternatively, the terminal apparatus can be configured to send each polling response data set (which meets the eligibility conditions) directly to the center apparatus when it is received from a remote control apparatus.

If the polling eligibility conditions are not met by a polling response data set which is received by the terminal apparatus, then data for an error message are sent by the terminal apparatus to the corresponding remote control apparatus 2300, to be displayed by the information display section 2304 of the remote control apparatus 2300. The user is thereby notified that his/her polling response has not been allowed.

When a polling response data set, sent from a terminal apparatus 2200, is received by the center apparatus 2100, the central processing unit 2101 extracts the remote control apparatus identification number, the personal attribute information, and the user input data which are attached to the polling response data, and stores these in the data base section 2105.

As each polling response data set is received, the center apparatus checks to ensure that multiple responses have not been sent from the same remote control apparatus, i.e. by the same user. This is done by checking that the remote control apparatus identifier of a received response is not identical to that of any remote control apparatus identifier which has already been received and stored as described above. If a second occurrence of the same remote control apparatus identification number is detected, then the monitoring section 2102 notifies the central processing unit that a polling response has already been received from the remote control apparatus concerned, so that the latest polling response received from that remote control apparatus is not valid. In that case, the center apparatus

generates data of a warning message, and attaches thereto the identifier of the remote control apparatus concerned, to form a warning message data set. The center apparatus then determines the terminal apparatus identifier corresponding to that remote control apparatus identifier, and sends the warning message data set via the network to the appropriate terminal apparatus 2200. That terminal apparatus then sends the warning message data to the remote control apparatus 2300 concerned. On receiving the warning message data, that remote control apparatus 2300 displays a warning message by the information display section 2304, thereby notifying the user that her or she has input multiple polling responses.

The received polling response data are totaled by the center apparatus in accordance with user personal attributes, based on the personal attribute information which has been attached to the polling response data. Fig. 8 shows an example of the data totaled in that manner. In this example, the poll consists of an opinion survey of users, the personal attribute information item which is specified in the personal attribute information list is "age of user", and the polling result data are classified according to respective age ranges of the responding users, as shown.

As stated hereinabove, the contents of Fig. 3, used in the above explanation, are provided only to illustrate the basic concepts of this embodiment. The actual functions described above are performed by execution of various computer program routines by the center apparatus, each terminal apparatus and each remote control apparatus, as required. Figs. 9A, 9B constitute a flow diagram of an example of the processing executed by the center apparatus of this embodiment, Figs. 10A, 10B constitute a flow diagram of an example of corresponding processing executed by a terminal apparatus of this embodiment, and Figs. 11A, 11B constitute a flow diagram of an example of corresponding processing executed by a remote control apparatus of this embodiment. In Figs. 9A, 9B it is assumed that polling result data are supplied by the system only to those users who have participated in the poll, i.e. that the result data are sent to the respective remote control apparatuses of those specific users, to be displayed by each remote control apparatus.

As an alternative to such an arrangement, the polling results could simply be broadcast from the center apparatus to all of the terminal apparatuses, to be displayed by their respective display apparatuses to all of the users.

As described in the above, according to a first characterizing feature of the above embodiment, it is possible to inherently prevent multiple polling responses by the same user, thereby preventing the polling results from being biased towards specific users. According to a second characterizing feature, since polling results can be directed by the center apparatus to specific remote control apparatuses (i.e. each identified by the corresponding remote control apparatus identifier), it is



tus identifiers) in a sequence which is determined by the respective response time values, i.e. arranged successively beginning from the shortest value, to thereby obtain the polling results. Fig. 13 shows an example of the relationship between the polling sequence, the times at which polling responses are received by the center apparatus, and response time intervals. This illustrates that the polling results are independent of the times at which polling responses are received from the terminal apparatuses, but depend only upon the respective response time intervals.

Thus, it is a feature of the second embodiment of the present invention that the response times of respective users with respect to each terminal apparatus are used as a reference for determining the arrival sequence of polling responses, so that the polling response sequence can be established in a fair manner, which is not affected by delays of respectively different transmission paths over which response data are sent to the center apparatus from the various users.

From the above description of the first and second embodiments, it can thus be understood that the following effects are obtained when an interactive television system is utilized as an electronic polling system according to the present invention:

First, multiple responses to a polling request by the same user can be prevented.

Second, the polling response sequence can be fairly established, irrespective of differences between delay times of different communication paths by which responses are sent to the center apparatus by respective users.

Third, it is possible for the center apparatus to send respectively separate messages (for example, to indicate to a specific user his or her position in the polling results) to each of various remote control apparatuses that are being used, with respectively different information being thereby displayed by the various remote control apparatuses.

Fourth, each of the remote control apparatuses can store detailed personal attribute information of a user, however but only that part of the personal attribute information which is actually necessary for the purpose of executing a particular poll is transmitted from the remote control apparatus of a user to the corresponding terminal apparatus and the center apparatus, and that personal information is used only for the time required to analyze the polling results, i.e. need not be held stored for any substantial time at any position in the system other than in the personal remote control apparatus of a user. Hence, the possibility of violation of user privacy can be prevented. In addition, this enables the function of management of personal attribute information to be distributed among the remote control apparatuses, so that it becomes possible to prevent a concentration of information handling load on the center apparatus.

Fifth, since any requisite items of personal attribute information can be extracted from the detailed personal

attribute information which is stored in each remote control apparatus, and attached to polling response data which are sent to the center apparatus, the polling results can be analyzed in terms of various types of personal attributes, thereby enabling the polling response data to be effectively analyzed and utilized.

Sixth, polling eligibility conditions can be established whereby polling is limited to only those users who are appropriate for participating in a specific poll. For example, some types of survey can be limited to adults, while others can be limited to children. Such a feature also has the advantage that, since unnecessary responses can be eliminated from being transmitted from remote control apparatuses through the system to the center apparatus, the number of polling responses received by the center apparatus can be minimized to only the necessary number, thereby enabling the total amount of transmitted data to be minimized. This enables efficient use of communication paths such as a CATV network. In addition, since it becomes unnecessary for the center apparatus to execute processing for examining each of the received polling responses to determine whether the user is eligible to participate in the poll, the polling management load is more effectively distributed within the system, i.e. among the remote control apparatuses rather than being excessively concentrated on the center apparatus.

Seventh, polling validity term data can be attached to the polling request data. As described above, this can be used to notify the users when the end of the term for sending polling responses becomes close, reducing the possibility of users inadvertently omitting to send responses.

Fig. 14 is a flow diagram of an example of the operations executed by the center apparatus of the above second embodiment, to carry out a poll of users of the system. Figs. 15A, 15B constitute a flow diagram of a corresponding example of the operations which would be executed by a terminal apparatus of the above embodiment, while Fig. 16 is a flow diagram of an example of the operations executed by a remote control apparatus of the above embodiment.

A third embodiment of the present invention will be described referring to the drawings. This embodiment will be described for the case in which the system is used to respond to requests (i.e. requests which are input by using a remote control apparatus) from users for various services which can be provided by the center apparatus. Fig. 17 is a diagram showing the configuration of a remote control apparatus of this embodiment. Figs. 18A and 18B constitute a conceptual block system diagram showing the general configuration of an interactive television system according to this embodiment. In the same way as for the preceding embodiments, only a single terminal apparatus of the system is shown, for simplicity of description.

In Fig 18A, the terminal apparatus 306 receives message data, i.e. service request data, from remote control apparatuses 301, via an optical data trans-



card having a specific type of IC mounted thereon, enabling the IC to be electrically connected via a data input port 209 to the CPU 203 of the remote control apparatus. The IC can for example be a small ROM (read-only memory) or data register having a specific code fixedly stored therein, with a corresponding user-specifying code being held in the personal information storage section 206. In that case, before inputting message data, e.g. before inputting service request data, a user must first insert the appropriate IC card into the interface section 210. The CPU 203 then executes processing to compare the data provided by the IC card with the user-specifying code which is stored in the personal information storage section 206, to effect recognition of an authorized user.

Alternatively, instead of supplying such code data obtained from an IC via the data input port 209, the remote control apparatus of this embodiment can be configured to include a fingerprint information generating section, as illustrated in Fig. 19. Here, the fingerprint information generating section 215 consists of a fingerprint scanning section 212, which can scan a user's fingerprints to obtain resultant signals, and a fingerprint pattern processing section 211, which converts these signals into fingerprint pattern data. In that case, the identification information storage section 206 has stored therein, as the user-specifying information, fingerprint pattern data of an authorized user, which have been set therein beforehand (e.g. by an authorized user employing the fingerprint information generating section 215 in a predetermined "registering" mode, to register his or her fingerprint pattern data in the identification information storage section 206, rather than in a usual "recognition" mode).

With that version of this embodiment, before inputting message data via the remote control apparatus, the user's fingerprint must first be recognized as that of an authorized user, e.g. by the user placing a finger over a specific region of the surface of the remote control apparatus, or simply by grasping the remote control apparatus in a normal manner. Since various types of circuits and components for performing such fingerprint recognition are now well known, detailed description will be omitted.

As a further alternative version of the remote control apparatus of this embodiment, the user-specifying information can be generated as voice pattern data. In that case, the user-specifying information which are supplied to the data input port 209 are generated by a voice information generating section 216 as illustrated in Fig. 20. As shown, this consists of a microphone input section 217 (e.g. a microphone and preamplifier circuit), which supplies electrical signals to a voice pattern processing section 218. The voice pattern processing section 218 generates corresponding voice pattern data, while voice pattern data of an authorized user are held stored, as user-specifying information, in the identification information storage section 206. The remote control apparatus is capable of registering such voice

pattern data of an authorized user beforehand, as described for the case of fingerprint recognition. In this case, to achieve recognition of an authorized user, the user must speak into the microphone input section 217, and the resultant voice pattern data are then compared with the stored voice pattern data.

Fig. 21 is a flow diagram of an example of the processing which is executed by the CPU 203 of a remote control apparatus of this embodiment to perform the operation described above, for the case in which the user identifier information is attached directly to the service request data, in a request data set, i.e. without encryption. not while Fig. 22 is a corresponding flow diagram of the processing executed by the CPU 312 of a corresponding terminal apparatus of this embodiment.

In these diagrams, it is assumed that each remote control apparatus can be utilized by both authorized and non-authorized users. If a non-authorized user inputs a service request, then the remote control apparatus generates and transmits a corresponding request data set, however that data set does not include the user identifier information. When such a request data set is received by the center apparatus, the center apparatus will provide only those services which are available to non-authorized users.

However it would be equally possible to ensure that each remote control apparatus, or some specific remote control apparatuses, are reserved for the use of only a particular authorized user. In that case, if user recognition is not achieved, then any service request which is input to the remote control apparatus will not result in transmission of a request data set. For example, this could readily be accomplished by a simple modification, e.g. whereby the steps S6 and S7 in the flow diagram of Fig. 21 are omitted, so that any data which are keyed in by an unauthorized user is, in effect, ignored by the remote control apparatus.

Fig. 23 is a flow diagram of an example of the processing which is executed by the CPU 203 of a remote control apparatus of this embodiment to perform the operation described above, for the case in which the user identifier information is encrypted before being attached to the service request data, in a request data set, to be subsequently decrypted when received by the terminal apparatus, while Fig. 24 is a corresponding flow diagram of the processing executed by the CPU 312 of the corresponding terminal apparatus. In the case of the processing shown in Figs. 21, 22 and 23, 24, it can be assumed that the method of inputting the user-specifying information, by a user, is different from the method of inputting service request data, i.e. the user-specifying information may be input via the data input port 209 of Fig. 17, by a method such as the plug-in IC card, fingerprint recognition, or voice pattern recognition. However if the user-specifying information must be input by key actuations, i.e. is a specific code such as a password which must be input by the user, then it is necessary for the remote control apparatus to differentiate

mined key of the key input section 208 (e.g. an "enter" key), causing the CPU 203 to generate a corresponding request data set as described above for the second and third embodiments, and send that to the center apparatus via the corresponding terminal apparatus.

Fig. 28 is a flow diagram of an example of the processing which is executed by the CPU 203 of a remote control apparatus of this embodiment to perform the operation described above, i.e. whereby the user inputs service request data by utilizing bar code scanning.

In some applications, particularly in the case of video home shopping, a user may wish to send a large number of different service requests to the system, e.g. a number of requests to purchase various different articles. In that case it is inefficient, with respect to system utilization, for separate data transfer operation to be executed from the terminal apparatus to the center apparatus in response to each of these successive requests. As a modification of the above embodiment, this can be configured such that successive items of information which are input by successive bar code scanning operation are stored in the input data temporary storage section 219, until the user has completed selecting the various items. The user can then actuate the aforementioned predetermined key, or perform some other action which indicates to the remote control apparatus that bar code item selection has been completed, whereupon a request data set will be generated which consists of the entire set of selected items, i.e. entire set of service request data items, with the remote control apparatus identifier and user identifier information attached thereto, and this request data set will be transmitted via the terminal apparatus to the center apparatus. The various service request items will then be handled sequentially by the center apparatus. By sending all of the selected service requests together in this way, efficient use of the CATV network is achieved.

Fig. 29 is a flow diagram of an example of the processing which is executed by the CPU 203 of a remote control apparatus of this embodiment to perform the operation described above, i.e. whereby the user inputs service request data by utilizing bar code scanning, but whereby a plurality of service request data items can be accumulated and then sent together to the center apparatus.

As another embodiment of the invention, utilizing the same remote control apparatus configuration as that shown in Fig. 27, it is possible for a plurality of data items, respectively input by bar code scanning, to be held in the input data temporary storage section 219, with corresponding data being generated by the CPU 203 and supplied to be displayed by the LCD display section 201, in the form of a menu. In the case of video home shopping for example, each such data item might correspond to information necessary for requesting the purchase of a specific article. The user can then designate one or more of these data items to be sent (i.e. as service request data) to the center apparatus, as

described for the preceding embodiments. For example, each item in the menu thus displayed may be shown beside a specific numeral, in which case it can be arranged that a user can select a menu item by inputting the appropriate number, using the key input section 208.

Fig. 30 is a flow diagram of an example of the processing which is executed by the CPU 203 of a remote control apparatus of this embodiment to perform the operation described above, i.e. whereby the user inputs data items by utilizing bar code scanning, but whereby a plurality of data items can be accumulated and then displayed to the user in the form of a menu, from which the user can select one or more data items to be sent as service request data via the corresponding terminal apparatus to the center apparatus.

An embodiment will now be described whereby for the center apparatus controls the assignment of services to the users, in accordance with whether a service is restricted to users of registered remote control apparatuses, i.e. authorized users, and whether a requesting user is utilizing a registered remote control apparatus. An example of the operation of such an embodiment is shown in the flow diagrams of Figs. 31, 32 and 33. It is assumed here that a request data set is generated by a remote control apparatus by attaching only the remote control apparatus identifier to the service request data that has been input by the user, i.e. that no actual recognition of the user is performed by each remote control apparatus. However it would be equally possible of course to incorporate a user recognition function (as described hereinabove) into this embodiment, with each remote control apparatus being configured in that case as shown in Fig. 17 or Fig. 27.

Fig. 31 shows an example of the processing executed by the CPU of a remote control apparatus in an interactive television system according to this embodiment, Fig. 32 shows the corresponding processing which is executed by the CPU of a terminal apparatus of this embodiment, while Fig. 33 shows the corresponding processing which is executed by the CPU of the center apparatus.

With this embodiment, as shown in the flow diagrams of Figs. 32, 32, and 33, the center apparatus holds stored in memory a list of registered remote control apparatus identifiers, i.e. identifiers of remote control apparatuses which are respectively assigned to authorized users, and also has service status data stored in memory, which specifies those services which are restricted to being accessed only by registered users, i.e. ie. a corresponding list of services which are available only to authorized users. It can thereby be ensured that a request from a user for a service will only be responded to by the center apparatus if the service is not restricted, or if the service is restricted but the remote control apparatus identifier of the user is listed as that of an authorized user.

A specific example of using such a system would be in a hotel, in which a center apparatus can be con-

case, each response data set which is sent from a remote control apparatus could be reliably identified by the user as originating from a specific user, or a member of a specific class of user, in spite of the fact that each remote control apparatus need not be exclusively assigned to the user of a specific user.

Preferably, the identifiers assigned to the remote control apparatuses and to the terminal apparatuses are respectively unique within the system, while the center apparatus holds information which relates the remote control apparatus identifiers to their respective terminal apparatus identifiers. In that case, it is unnecessary for the terminal apparatus identifier to be attached to data which are sent from a remote control apparatus via its terminal apparatus to the center apparatus. The center apparatus must store information relating each remote control apparatus identifier to the identifier of the corresponding terminal apparatus. Such an arrangement is assumed in the various embodiments of the invention described hereinafter. However that is not essential, and it would be equally possible to ensure only that the terminal apparatus identifiers are unique within the system, and to arrange that when data are sent from a remote control apparatus via its terminal apparatus to the center apparatus, both the remote control apparatus identifier and terminal apparatus identifier are attached. In that case, it becomes unnecessary for the center apparatus to store the aforementioned relationships between remote control apparatus identifiers and terminal apparatus identifiers, but requires greater amounts of data to be transmitted from the terminal apparatuses to the center apparatus via the CATV network.

In the above descriptions of embodiments, it has been assumed for simplicity of description that there are only two possible classes of users, i.e. registered and unregistered users, who are respectively permitted, or not permitted, to access the restricted services. However in general the invention is applicable to a multi-level arrangement for classifying users. That is to say, certain individual users, or a certain category of users, might be registered by the system as being permitted to access a specific set of services, while other users or another category of users would be registered as being permitted to access a different set of services. In that case, the center apparatus (or each terminal apparatus) would store respectively different sets of service status data for the different sets of restricted service, with such data being relationally linked to remote control identifiers of respectively different sets of remote control apparatuses, for example. The operation of the system in such a case could easily be envisaged, by extension from the descriptions of embodiments provided hereinabove. In that way it would be possible to provide a plurality of different levels of service which are intended for respectively different users of the system.

## Claims

1. An interactive television system comprising a center apparatus, a plurality of terminal apparatuses, a plurality of display apparatus and a plurality of remote control apparatuses, said terminal apparatuses being respectively configured for bidirectional data communication with said center apparatus via a digital data communication network and each configured for receiving data by a wireless communication link from at least a corresponding one of said remote control apparatuses and for sending, to a corresponding one of said display apparatuses, data supplied thereto from said center apparatus;
 

wherein

each said remote control apparatus comprises means for input of message data by a user, means for storing a predetermined remote control apparatus identifier, means for reading out and attaching at least said remote control apparatus identifier to said user message data to form a message data set, and means for sending said message data set via said wireless communication link to said terminal apparatus,

each said terminal apparatus comprises means for storing a predetermined terminal apparatus identifier, means for receiving a message data set which is sent from a remote control apparatus, and means for sending said message data set to said center apparatus via said data communication network and means for receiving data sent from said center apparatus via said data communication network and for supplying at least a part of said received data to a corresponding one of said display apparatuses in a form suitable for display thereby,

said center apparatus comprising means for storing data which relate each of said remote control apparatus identifiers to the terminal apparatus identifier of a corresponding one of said terminal apparatuses, means for receiving said message data set sent from a terminal apparatus, means for extracting said remote control apparatus identifier and said user message data from said message data set, means for generating resultant data in response to said user message data, and means for sending said resultant data via said network to the terminal apparatus having a terminal apparatus identifier which corresponds to the remote control apparatus identifier contained in said received message data set.
2. An interactive television system according to claim 1, wherein said wireless communication link which connects each remote control apparatus to a terminal apparatus is a bidirectional data communication link, wherein each said remote control apparatus comprises data display means, wherein said result-

- which is received thereby, means for storing said remote control identifiers, and means for storing said personal attribute information and polling response data of respective users in a predetermined relational manner, means for analyzing said personal attribute information and polling response data obtained from a plurality of users to thereby obtain polling result data, and means for sending said polling result data via said data communication network to said terminal apparatuses.
7. An interactive television system according to claim 6, wherein said center apparatus further comprises means for comparing each remote control apparatus identifier of a received message data set with respective remote control apparatus identifiers which have been previously received and stored, for thereby detecting reception of multiple responses from any of said remote control apparatuses, and means for inhibiting use of the polling response data and personal attribute information contained in said message data set in deriving said polling result data.
  8. An interactive television system according to claim 7, wherein said wireless communication link which connects each remote control apparatus to a terminal apparatus is a bidirectional data communication link, wherein each said remote control apparatus comprises data display means, and wherein said center apparatus comprises means responsive to said detection of multiple responses from a remote control apparatus for generating data of a warning message, attaching said warning message data to the identifier of said remote control apparatus to form a warning message data set and for sending said warning message data set via said data communication network to the terminal apparatus having a terminal apparatus identifier which corresponds to the remote control apparatus identifier of said remote control apparatus, and wherein each said terminal apparatus comprises means responsive to receiving a warning message data set for extracting the remote control apparatus identifier therefrom and sending said warning message data to the corresponding remote control apparatus, to be displayed by said data display means of said remote control apparatus.
  9. An interactive television system according to any one of the preceding claims, wherein said interactive television system is operable to take a poll of respective users of said remote control apparatuses, said center apparatus comprises means for sending polling request data to each of said terminal apparatuses via said network, each said terminal apparatus comprises means for receiving said polling request data and supplying said polling request data to be displayed by said corresponding display apparatus, each said remote control apparatus is operable by a user to generate polling response data in response to said display of polling request data, and comprises means for reading out said remote control apparatus identifier, attaching said remote control apparatus identifier to said polling response data to form a message data set, and means for sending said message data set to said corresponding terminal apparatus, and each said terminal apparatus further comprises means for measuring, for each of said corresponding remote control apparatuses, an elapsed time amount which occurs from a commencement of said displaying of said polling request data until a message data set containing said polling response data is received from said remote control apparatus, and means for sending said elapsed time amounts in conjunction with respectively corresponding remote control apparatus identifiers, as resultant data, to said center apparatus via said data communication network, said center apparatus further comprising means for analyzing said resultant data received from said terminal apparatuses to obtain, as polling result data, data relating said remote control apparatus identifier to successively increasing values of said elapsed time amounts, and means for sending said polling result data to said terminal apparatuses.
  10. An interactive television system according to any one of claims 1 to 8, wherein said interactive television system is operable to take a poll of respective users of said remote control apparatuses, said center apparatus comprises means for sending polling request data to each of said terminal apparatuses via said network, each said terminal apparatus comprises means for receiving said polling request data, for supplying said polling request data to be displayed by said corresponding display apparatus, each said remote control apparatus is operable to by a user to generate polling response data in response to said displaying of polling request data, and comprises means for reading out said remote control apparatus identifier, attaching said remote control apparatus identifier to said polling response data to form a message data set, and means for sending said message data set to said corresponding terminal apparatus, each said terminal apparatus further comprises means for measuring, for each of said corresponding remote control apparatuses, an elapsed time which amount occurs from a commencement of said displaying said polling request data until a message data set containing said polling response

corresponding one of the terminal apparatuses,

means for receiving respective ones of said message data sets from said terminal apparatuses sent via said network,

means for extracting said remote control apparatus identifier and said service request data from each said message data set,

means for extracting said user identifier from each said message data set which contains said user identifier,

means for storing user status data designating at least one of said user identifiers as that of a registered user,

means for storing service status data designating at least one of said plurality of services as being a restricted service, available only to registered users,

means responsive to receiving a message data set which contains a user identifier for judging, based on said user status data, said service status data and said user identifier, whether a service specified by the service request data of said message data set is a restricted service which is available to the requesting user corresponding to the user identifier of said message data set, or is a service which is available to all users, and

means functioning when it is judged that said service specified by the service request data of a message data set is available to said user, for providing the corresponding service data and sending said service data via said network to the terminal apparatus having a terminal apparatus identifier which corresponds to the remote control apparatus identifier contained in said received message data set.

14. An interactive television system according to claim 4 or any claim dependent thereon or claim 13, wherein said means for inputting said user-specifying data comprises a plug-in integrated circuit card and interface means for electrically connecting said plug-in integrated circuit card to said remote control apparatus, said integrated circuit card having mounted thereon an integrated circuit operable for supplying data or signals which have been predetermined as being specific to an individual user.

15. An interactive television system according to claim 4 or any claim dependent thereon or claim 13 or 14, wherein said means for inputting said user-specifying data comprises key input means, manually actuable by a user for inputting a password code which has been predetermined as being specific to an individual user.

16. An interactive television system according to claim 4 and any claim dependent thereon or claim 13, 14

or 15, wherein said means for inputting said user-specifying data comprises fingerprint scanning means and fingerprint pattern processing means for operating on information obtained from said fingerprint scanning means to generate fingerprint pattern data, said stored user-specifying data comprising fingerprint pattern data which have been predetermined as being specific to an individual user.

17. An interactive television system according to claim 4 or any claim dependent thereon or claim 13, 14, 15 or 16, wherein said means for inputting said user-specifying data comprises microphone input means for generating an audio signal in response to voice input by a user, and voice pattern processing means for operating on said audio signal to derive voice pattern data, said stored user-specifying data comprising voice pattern data which have been predetermined as being specific to an individual user.

18. An interactive television system according to claim 4 or any claim dependent thereon or claim 13, 14, 15, 16 or 17, wherein each said remote control apparatus comprises data encryption means for encrypting said user identifier before sending to said terminal apparatus as part of a message data set, and wherein each said terminal apparatus further comprises data decryption means for decrypting an encrypted user identifier.

19. An interactive television system according to claim 13 or any claim dependent thereon, wherein each said remote control apparatus comprises key input means, actuable by a user for inputting said service request data.

20. An interactive television system according to claim 13 or any claim dependent thereon, wherein each said remote control apparatus comprises bar code scanner means, operable to acquire said service request data by scanning a bar code which appears on printed matter.

21. An interactive television system according to claim 20, wherein each said remote control apparatus further comprises

temporary data storage means for storing a plurality of service request data items which are successively acquired by said scanning of respective bar codes, means operable for designating that acquisition of said plurality of service request data items has been completed, and means responsive to said designation that said acquisition has been completed for reading out said plurality of service request data items from

control apparatus identifier which is contained in said received message data set.

24. An interactive television system comprising a center apparatus, a plurality of terminal apparatuses, a plurality of display apparatuses and a plurality of remote control apparatuses, said center apparatus including means for selectively provide data of a plurality of services, each of said terminal apparatuses being configured for bidirectional data communication with said center apparatus via a digital data communication network, and configured for receiving data by a wireless communication link from at least a corresponding one of said remote control apparatuses and for sending, to a corresponding one of said display apparatus, service data which are supplied thereto from said center apparatus;

wherein each said remote control apparatus comprises

means for storing a predetermined remote control apparatus identifier,

means operable by a user for inputting service request data to request a specific one of said services,

means for reading out and attaching said remote control apparatus identifier to said service request data to form a message data set, and

means for sending said message data set via said wireless communication link to said terminal apparatus;

wherein each said terminal apparatus comprises

means for storing a predetermined terminal apparatus identifier,

means for receiving a message data set sent from a remote control apparatus,

means for storing service status data designating at least one of said plurality of services as being a restricted service, available only to users of registered remote control apparatuses,

means for storing information specifying respective identifiers of registered remote control apparatuses,

means for judging, based on said service status data, information specifying identifiers of registered remote control apparatuses, and the remote control apparatus identifier contained in said received message data set, whether a service specified by the service request data of said message data set is a restricted service which is available to the user of the remote control apparatus having said remote control apparatus identifier, or is a service which is available

to all users, and

means functioning when it is judged that said service specified by the service request data of said message data set is available to said user, for sending said message data set to said center apparatus via said data communication network;

and wherein said center apparatus further comprises means for storing information which relates each of said remote control apparatus identifiers to the terminal apparatus identifier of the corresponding one of the terminal apparatuses,

means for receiving respective ones of said message data sets from said terminal apparatuses sent via said network, and

means for extracting said remote control apparatus identifier and said service request data from each said received message data set, providing the corresponding service data, and sending said service data via said network to the terminal apparatus having a terminal apparatus identifier corresponding to said remote control apparatus identifier which is contained in said received message data set.

25. An interactive television system comprising a center apparatus, a plurality of terminal apparatuses, a plurality of display apparatuses and a plurality of remote control apparatuses, said center apparatus including means for selectively provide data of a plurality of services, each of said terminal apparatuses being configured for bidirectional data communication with said center apparatus via a digital data communication network, and configured for receiving data by a wireless communication link from at least a corresponding one of said remote control apparatuses and for sending, to a corresponding one of said display apparatuses, service data which are supplied thereto from said center apparatus;

wherein each said remote control apparatus comprises

means for storing a predetermined remote control apparatus identifier,

means operable by a user for inputting service request data to request a specific one of said services,

means for reading out and attaching said remote control apparatus identifier to said service request data to form a message data set, and

means for sending said message data set via said wireless communication link to said terminal apparatus;

wherein each said terminal apparatus com-

FIG. 1

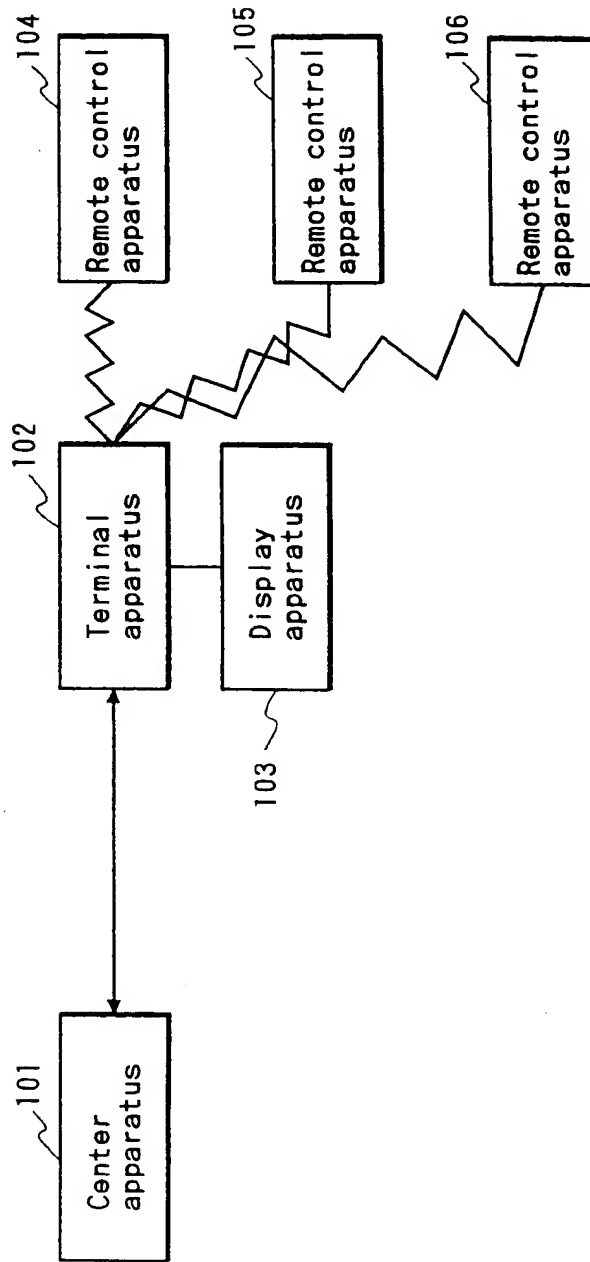
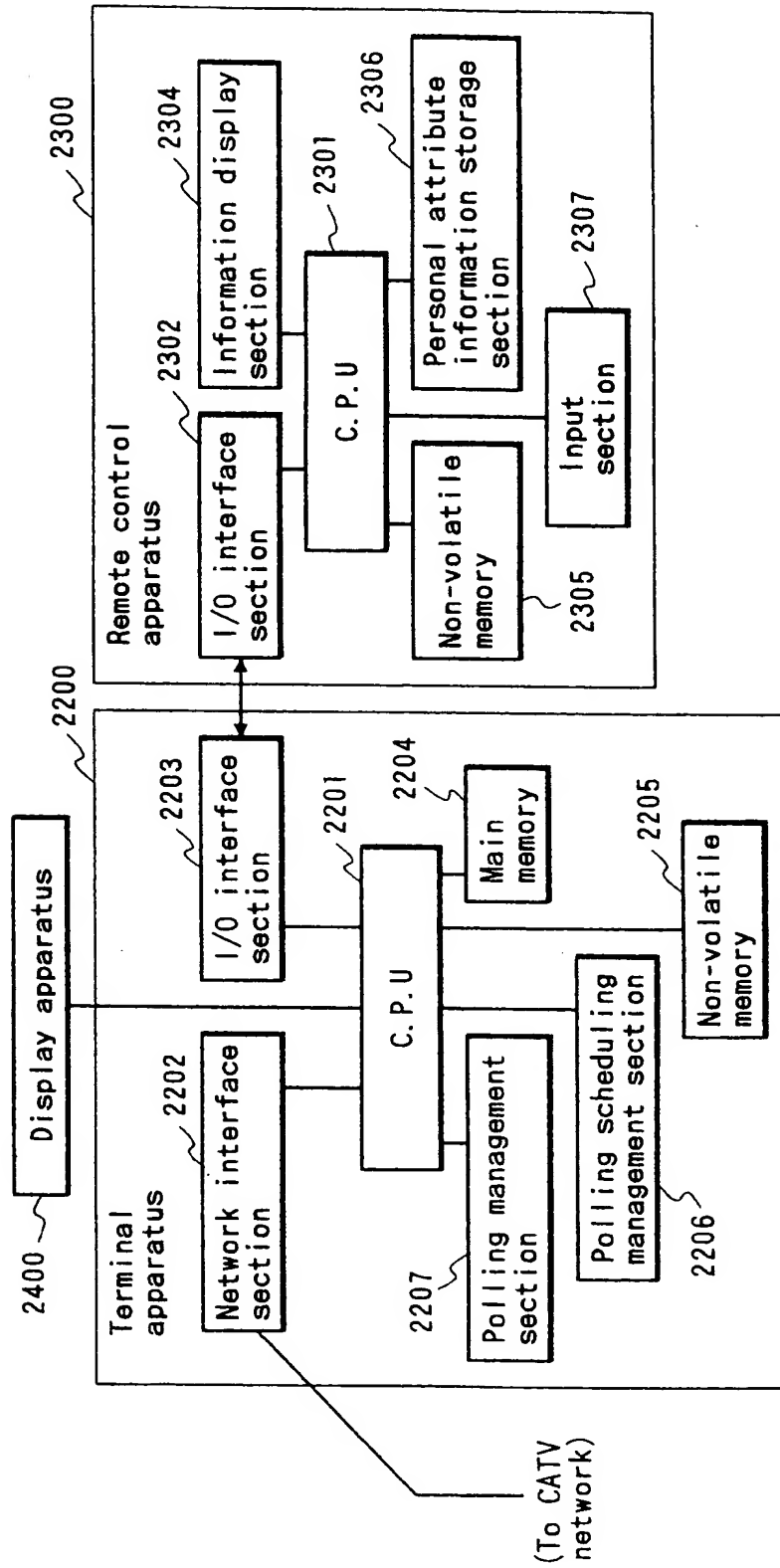




FIG. 3A



*FIG. 4*

Personal attribute item	Item data
Name	John Jones
Address	000 State St., Sacramento, CAL.
Sex	Male
Age	40
Date of birth	1/1/1945
Profession	Self-employed
Place of birth	Utah
Hobbies	Chess

*FIG. 6*

Polling request data	Polling eligibility conditions	Personal attribute information attachment list	Polling validity term information
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*FIG. 7*

Remote control apparatus I.D. number	Personal attribute information	Polling response data
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FIG. 9A

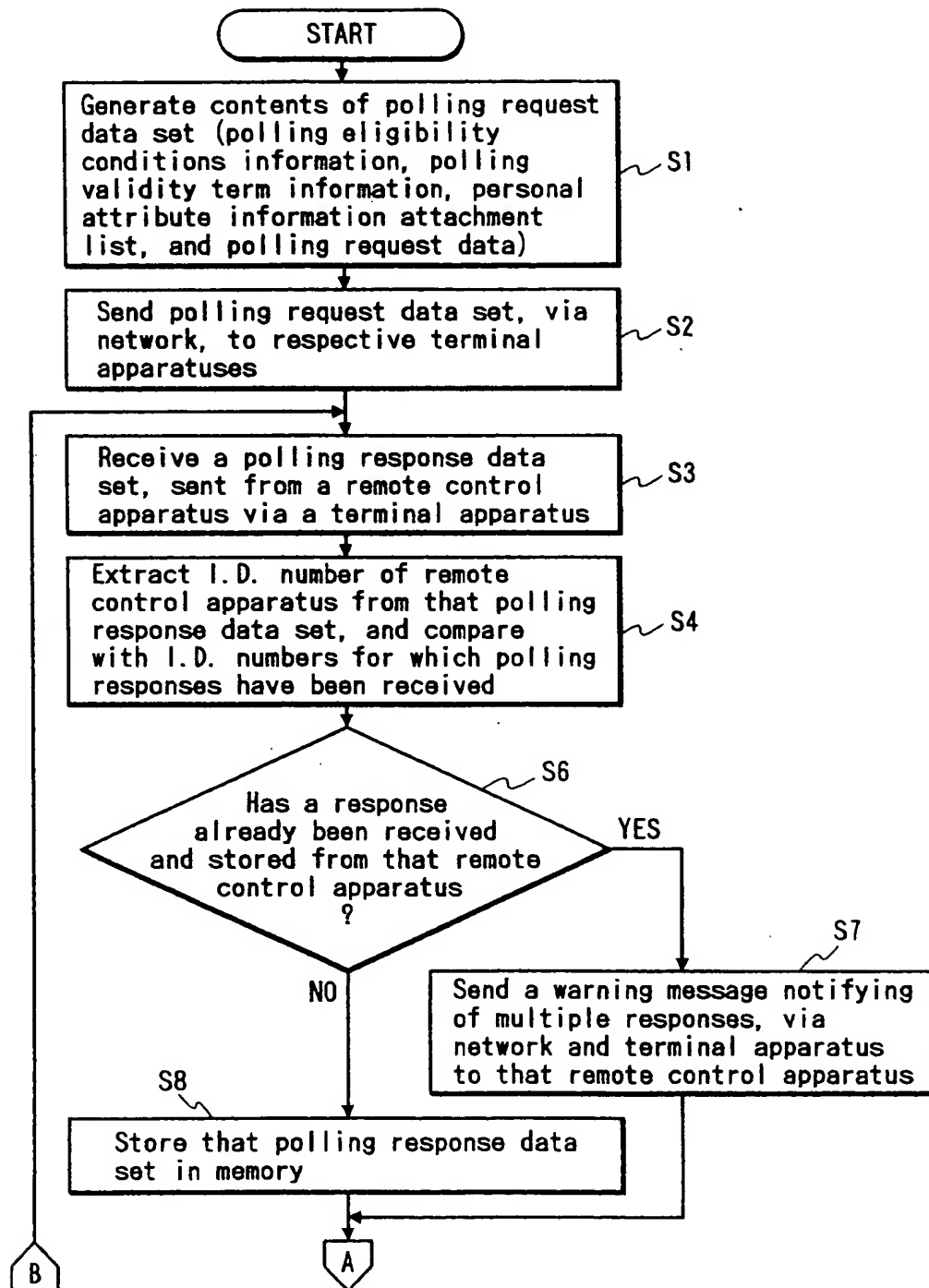


FIG. 10A

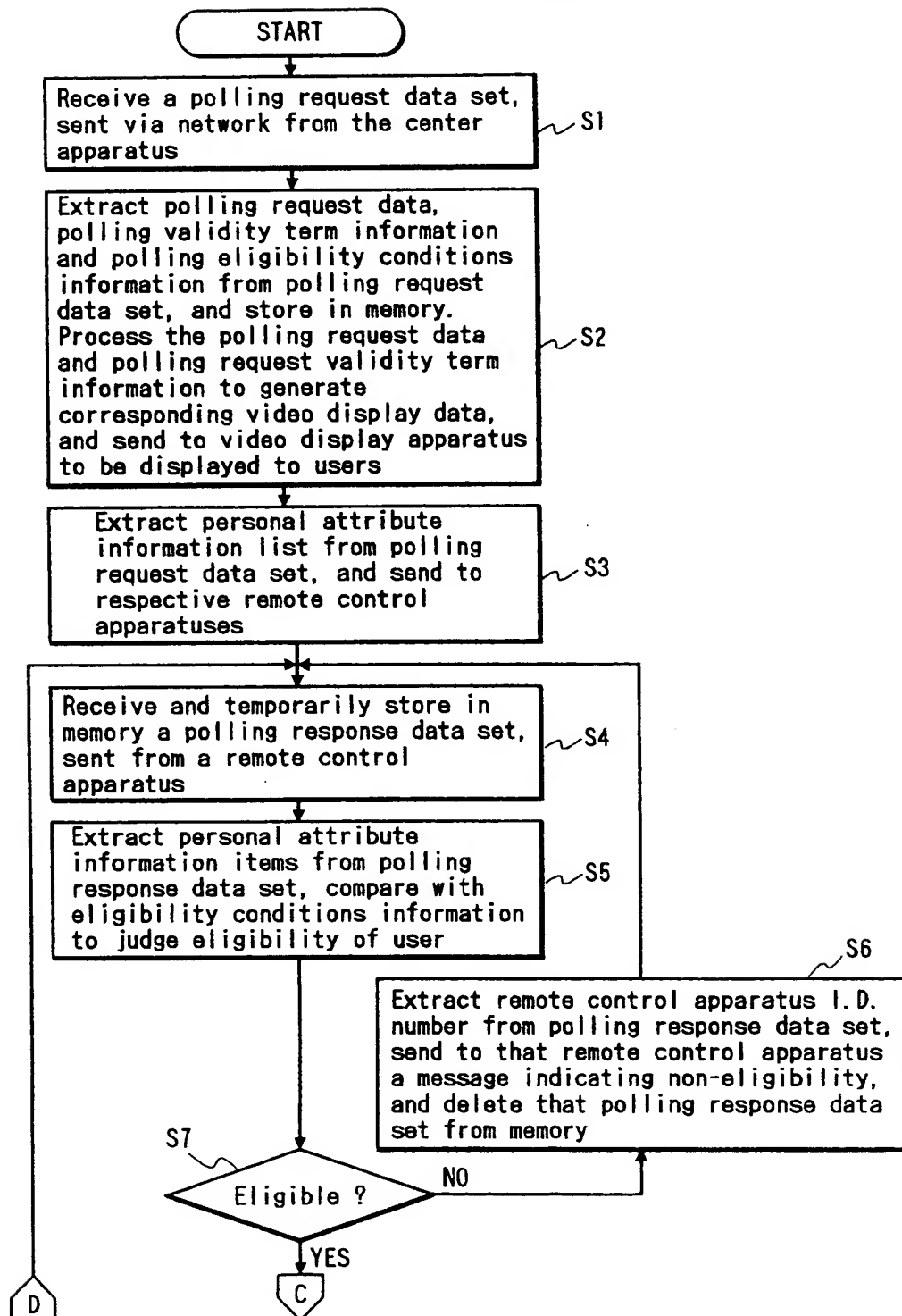


FIG. 11A

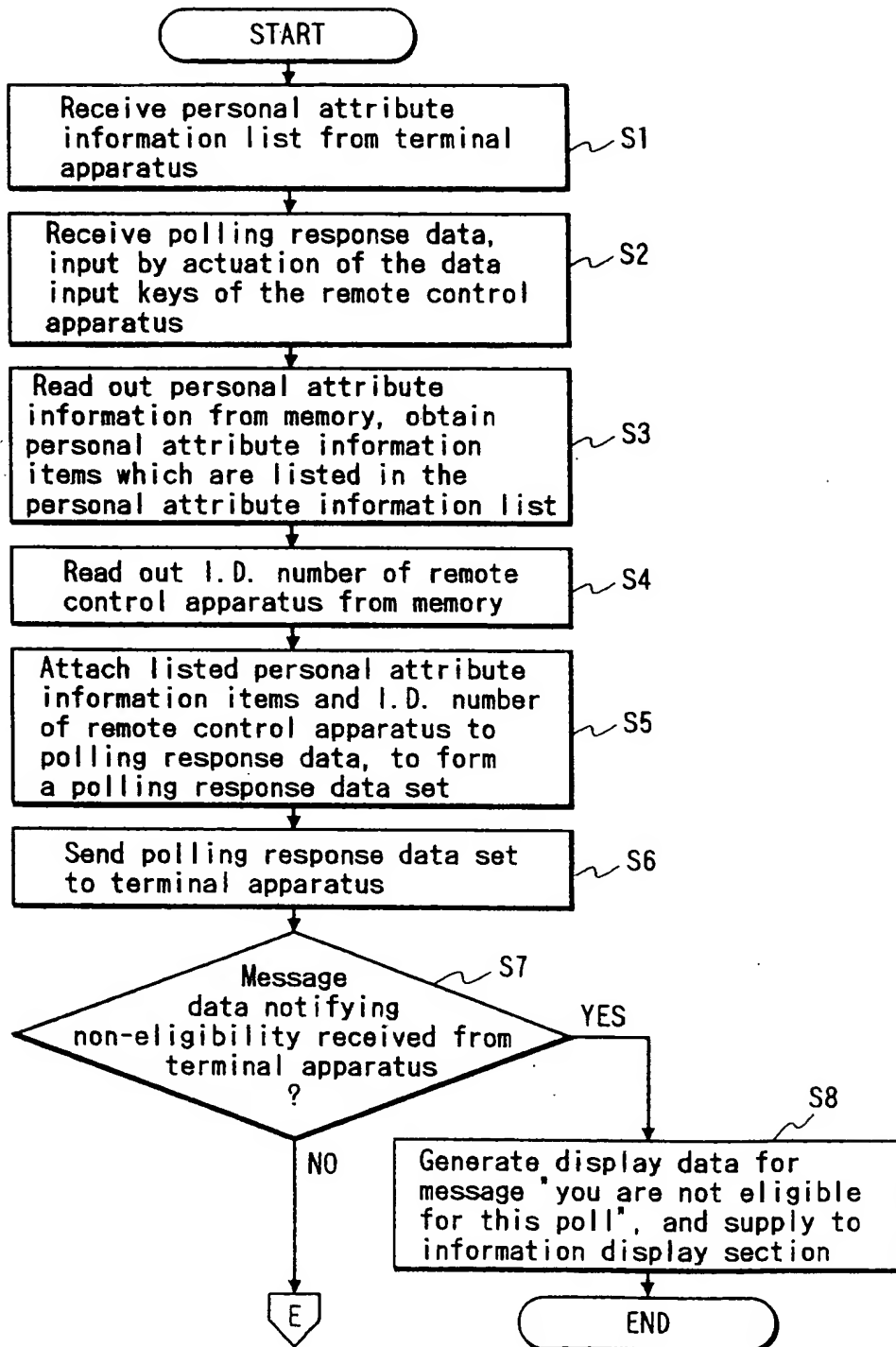


FIG. 12

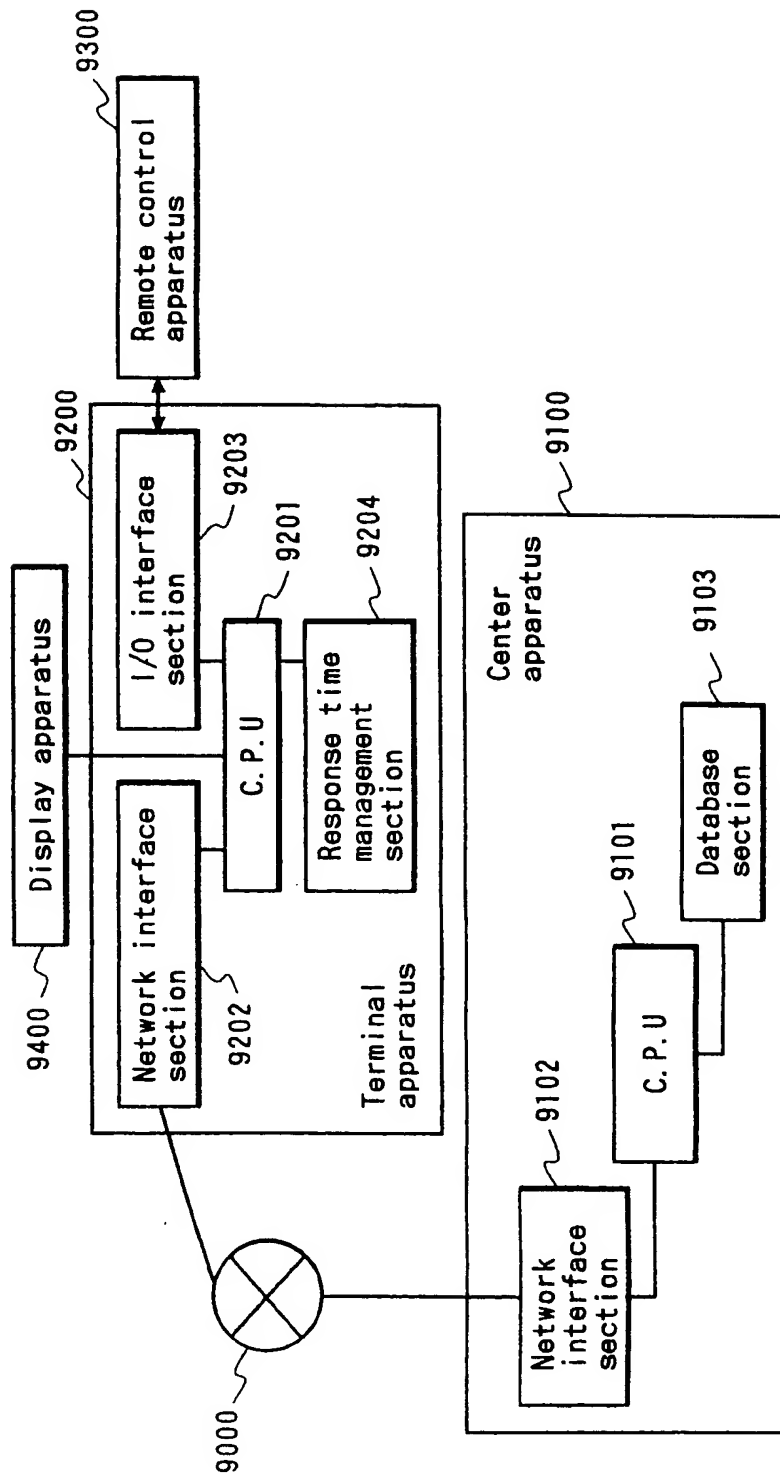
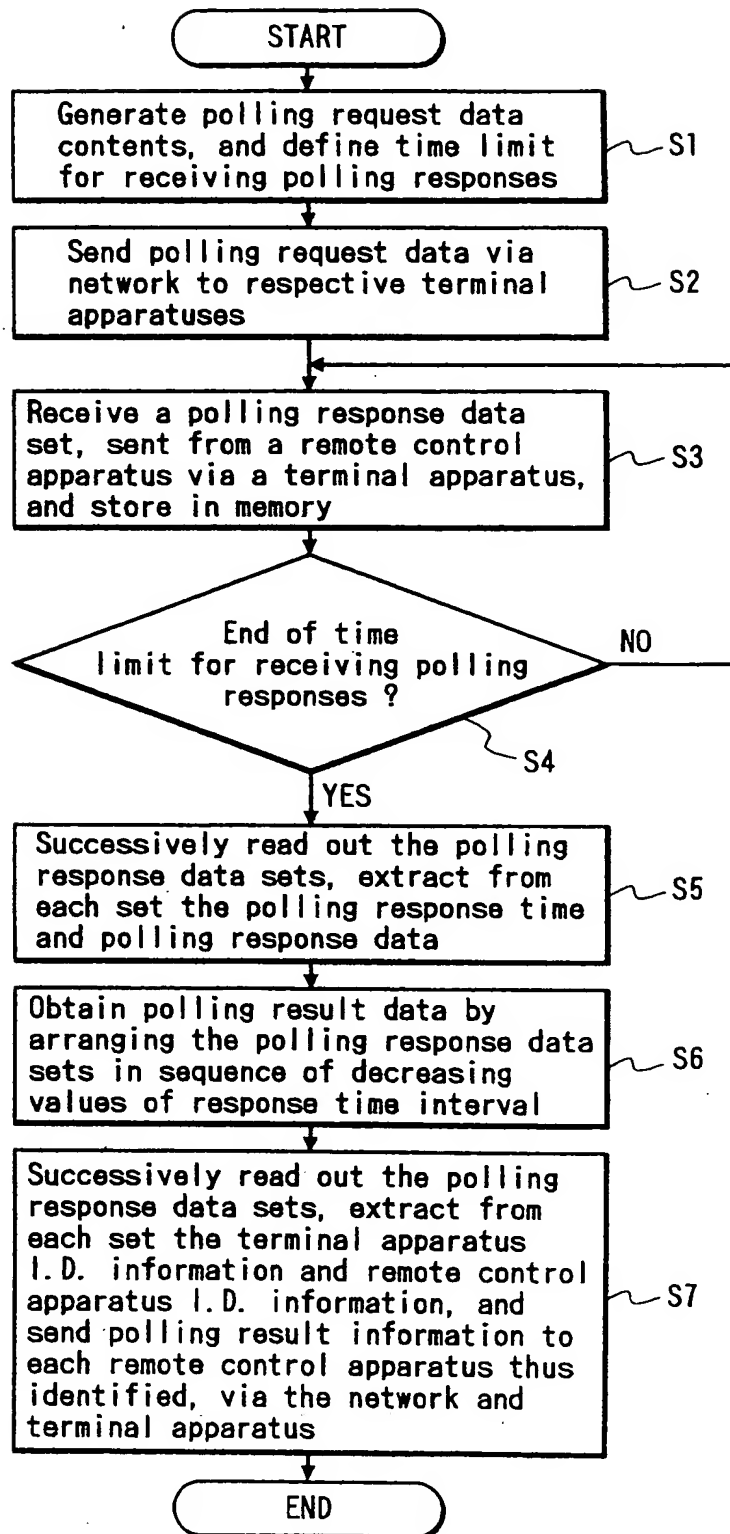




FIG. 14



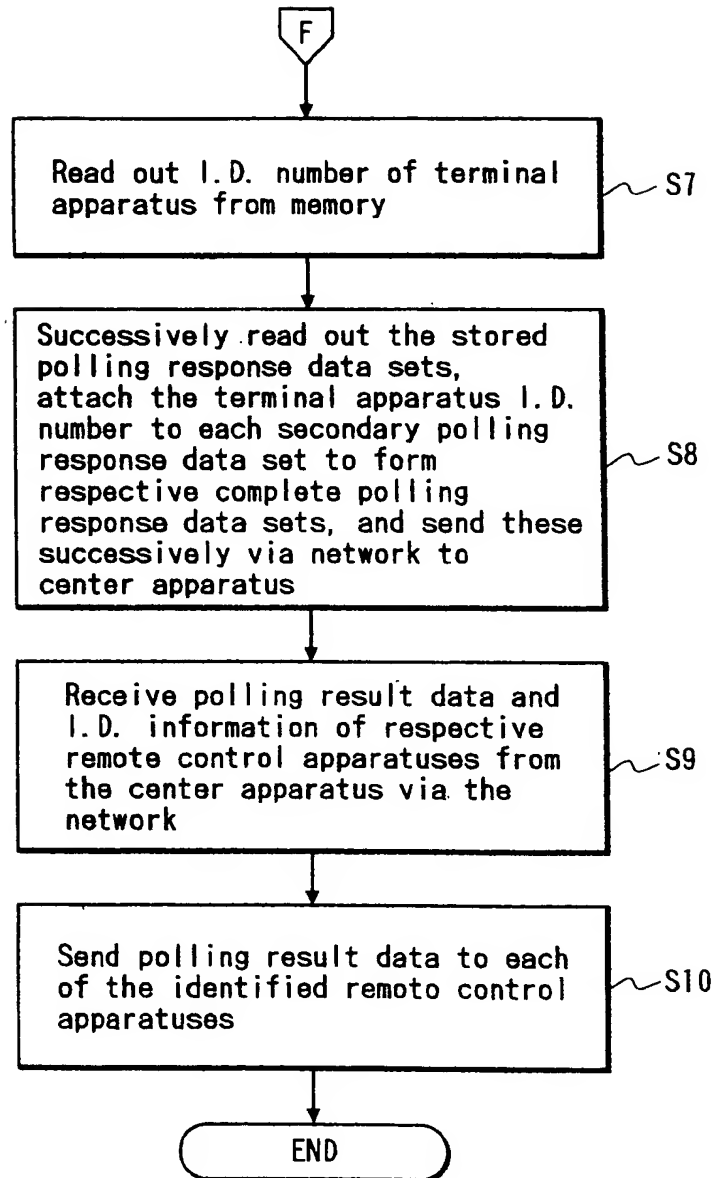
*FIG. 15B*

FIG. 17

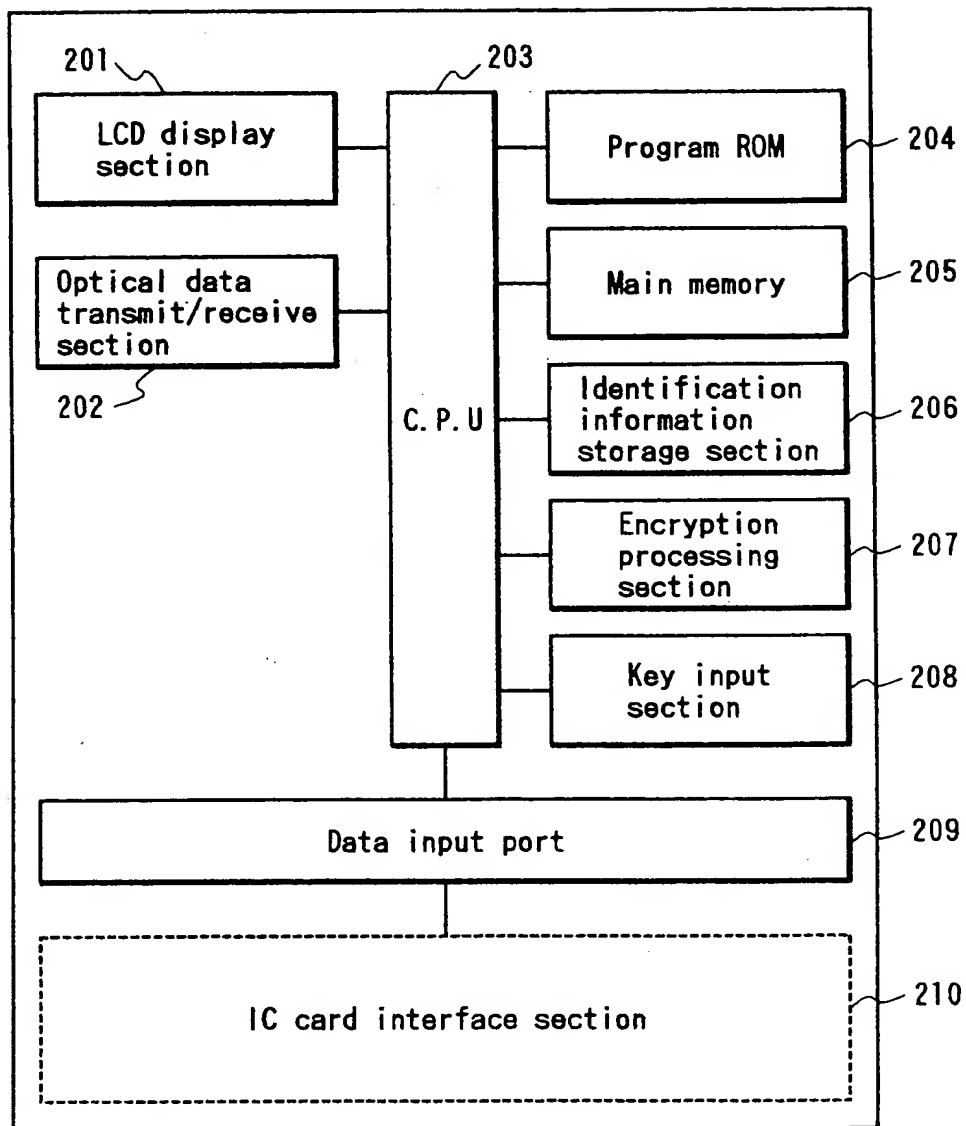


FIG. 18B

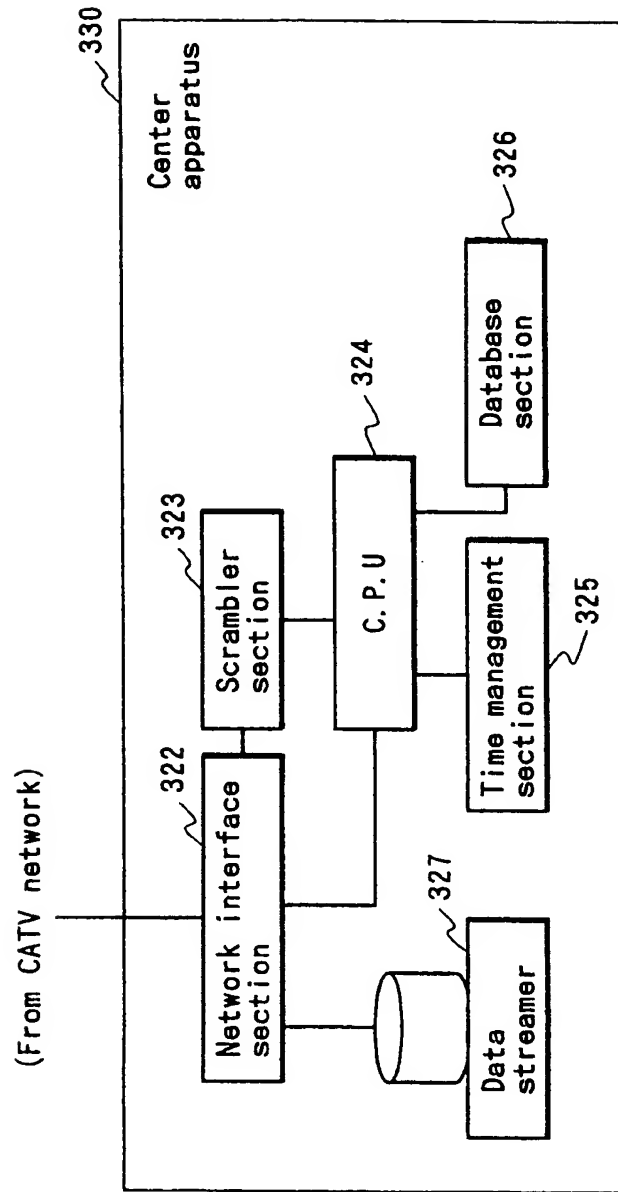


FIG. 21

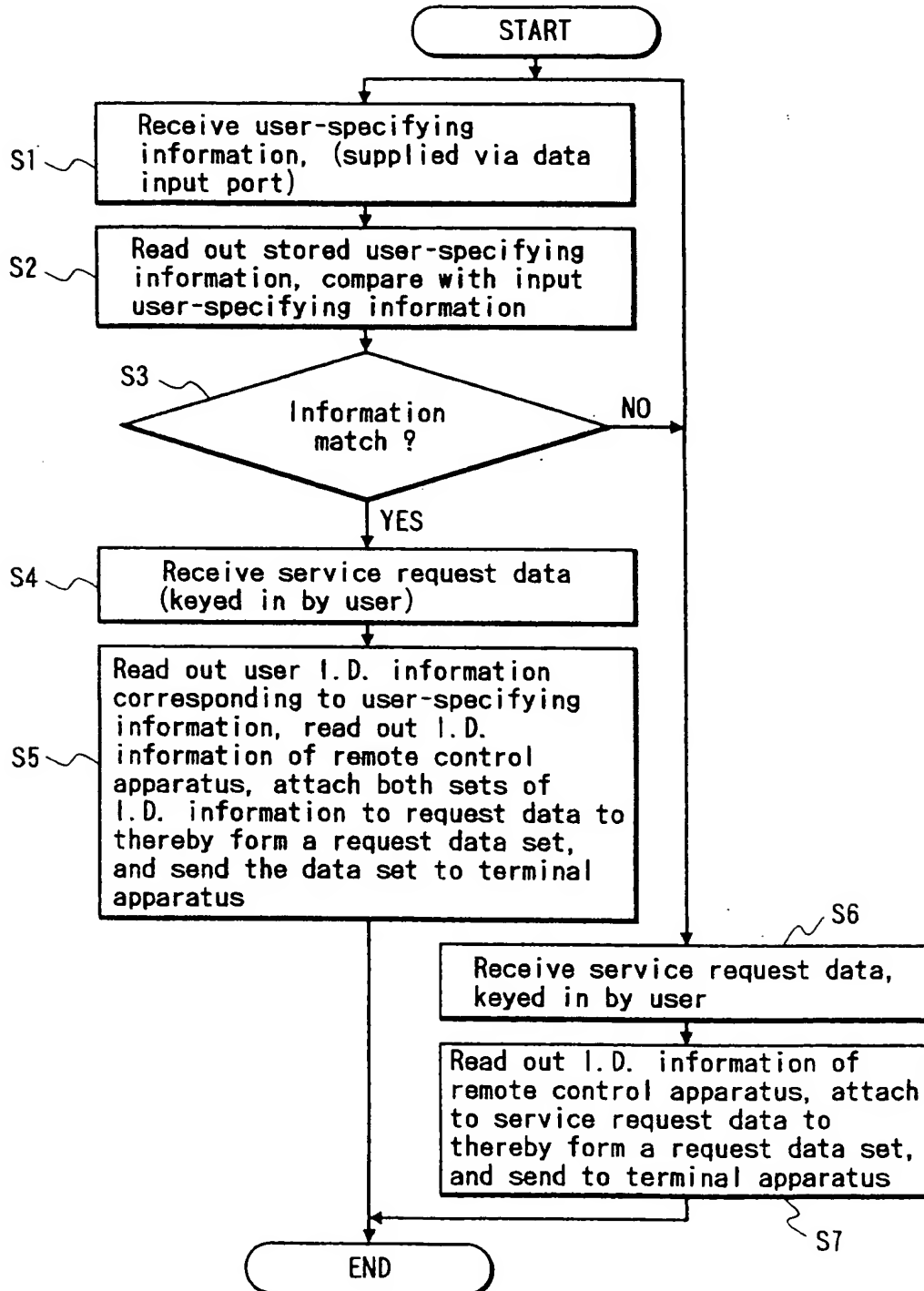


FIG. 23

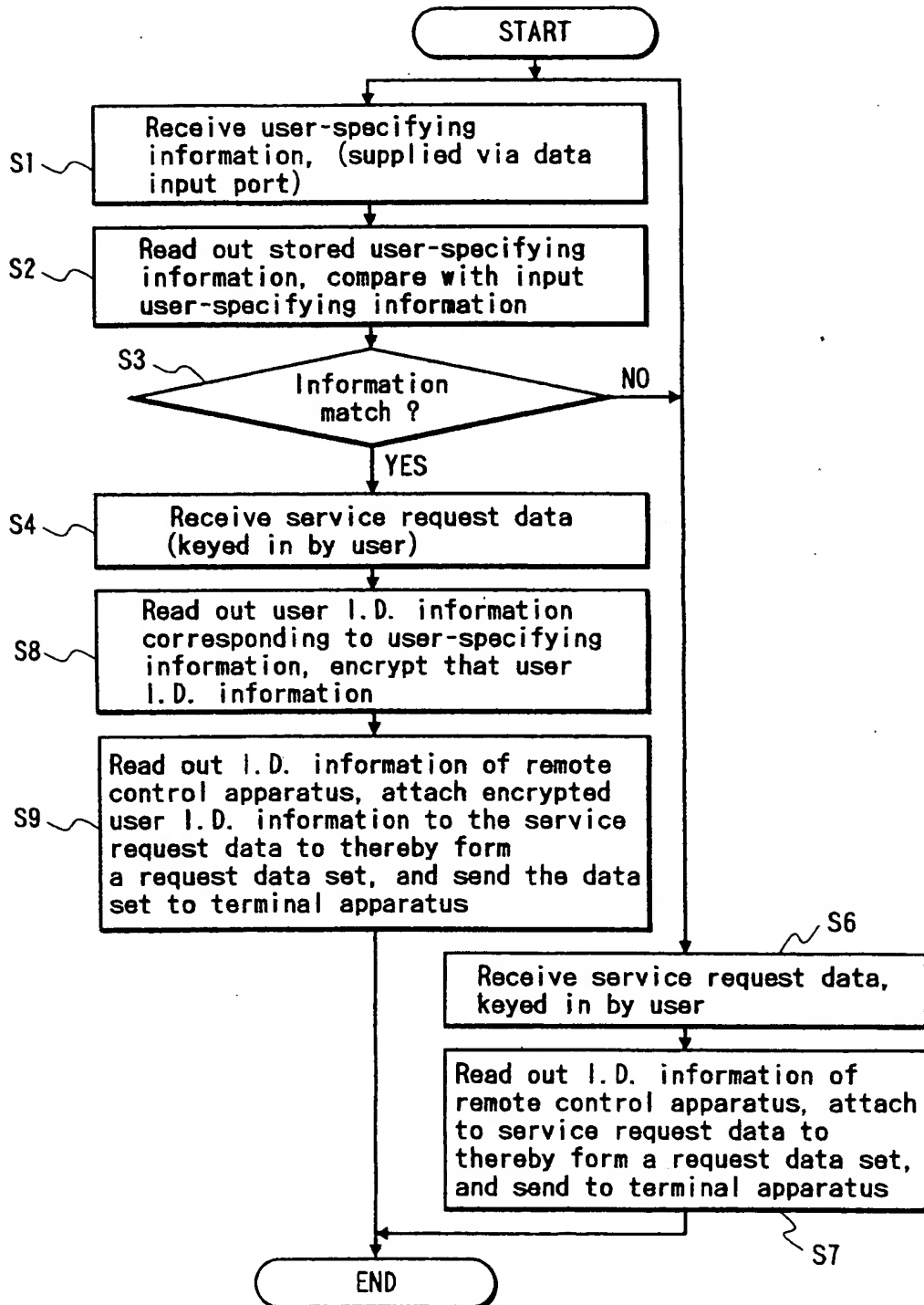


FIG. 25

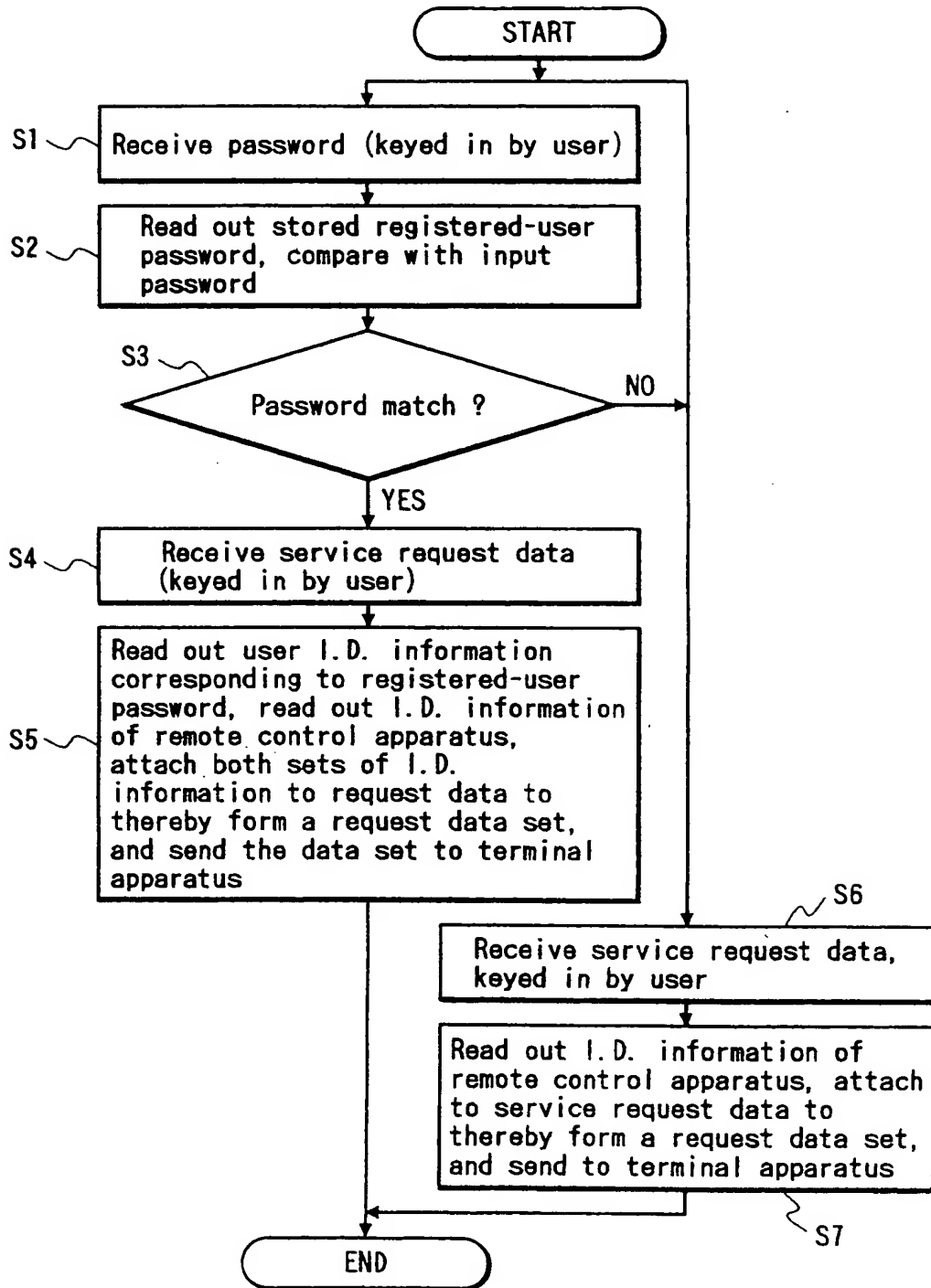




FIG. 27

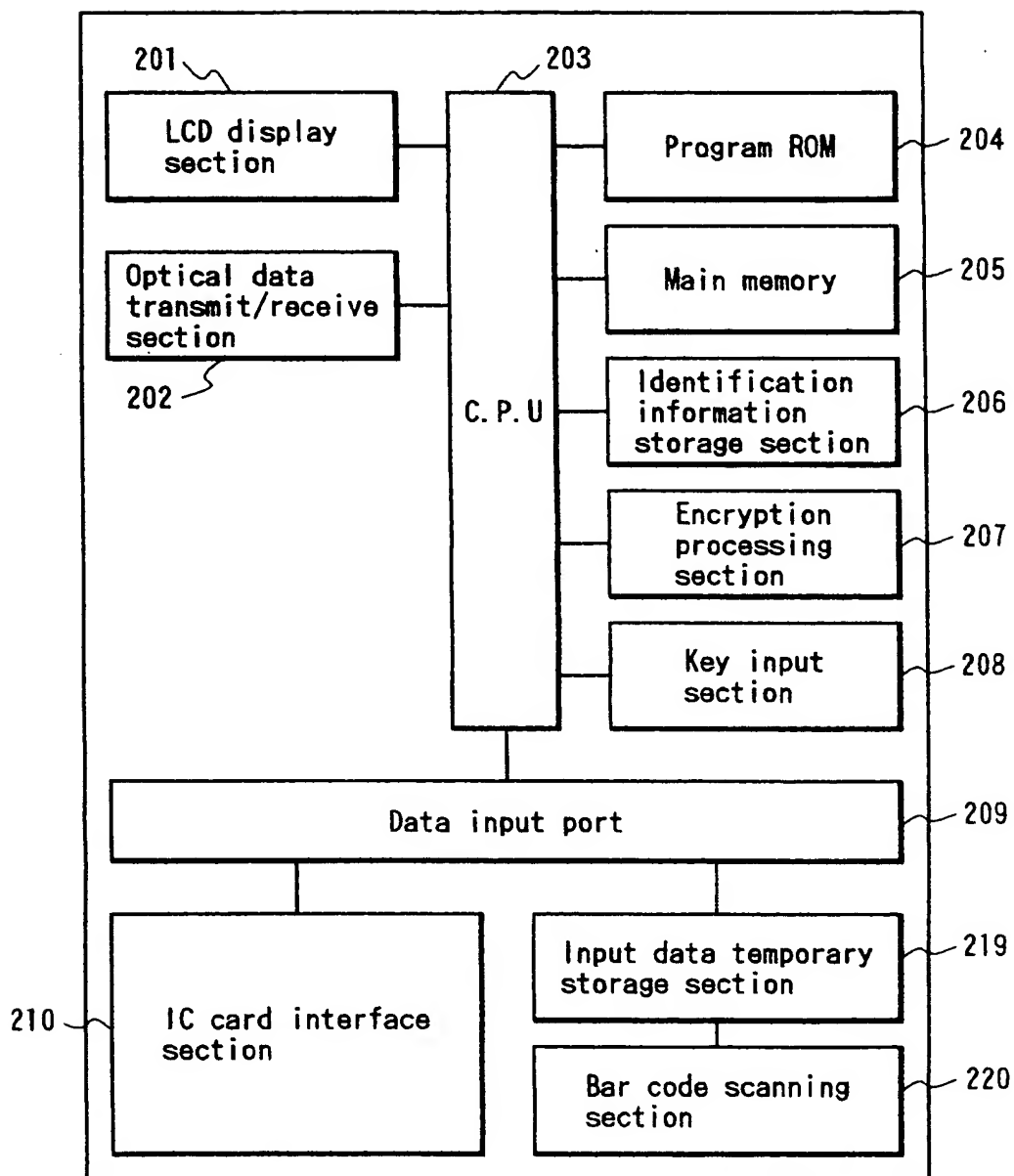
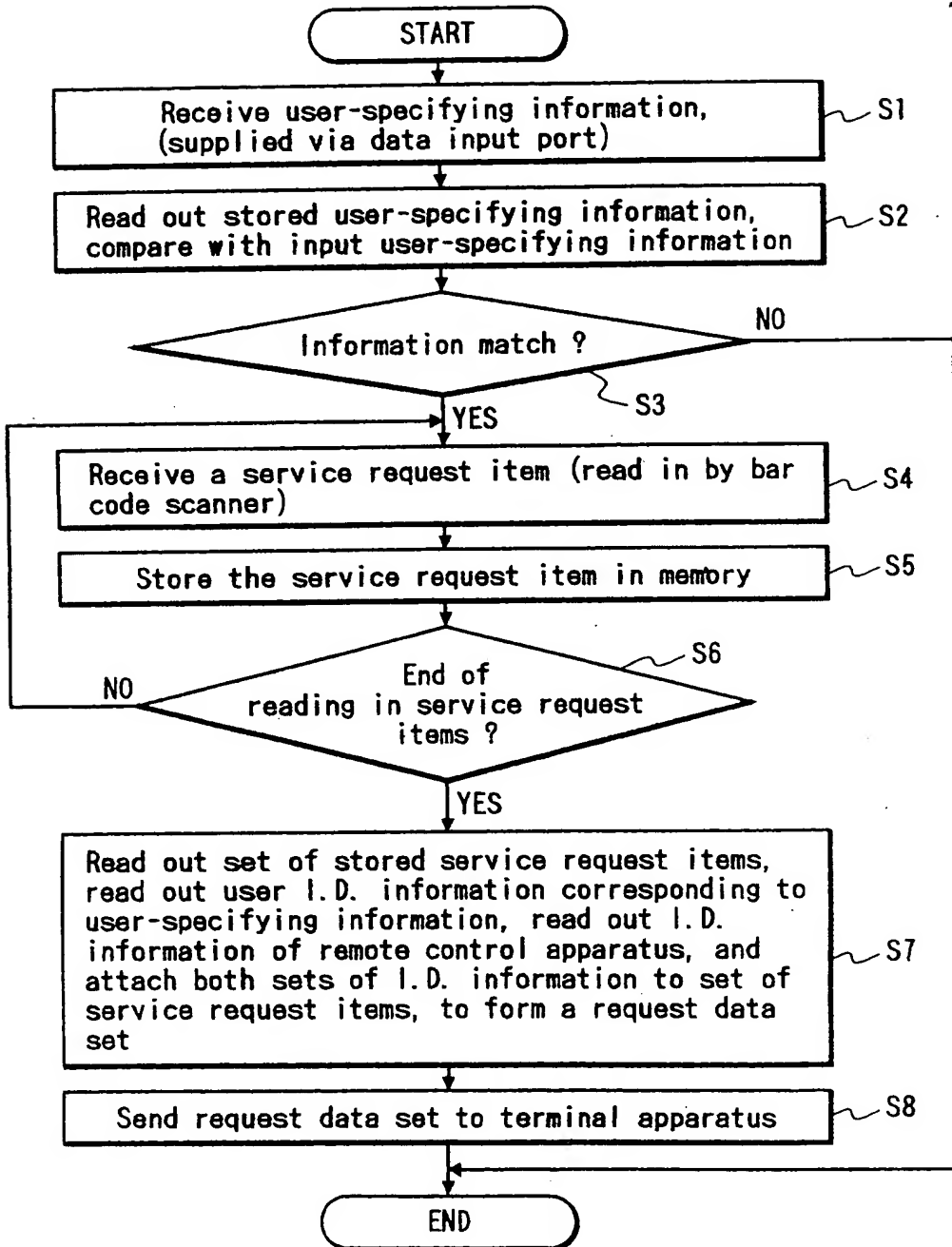
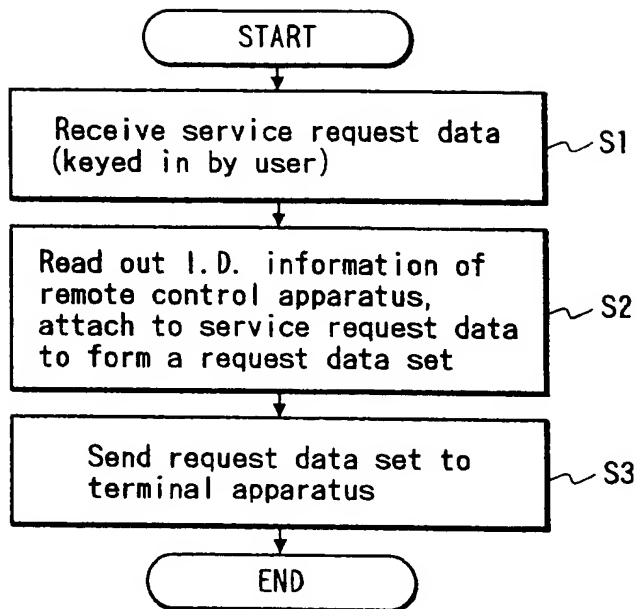
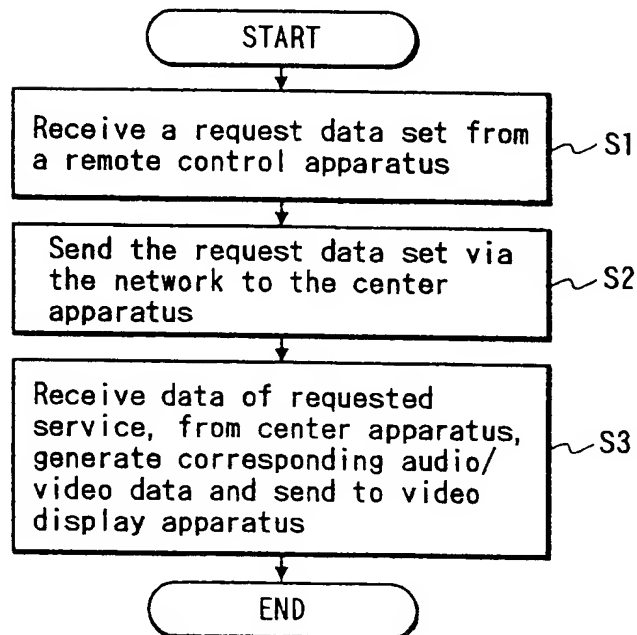
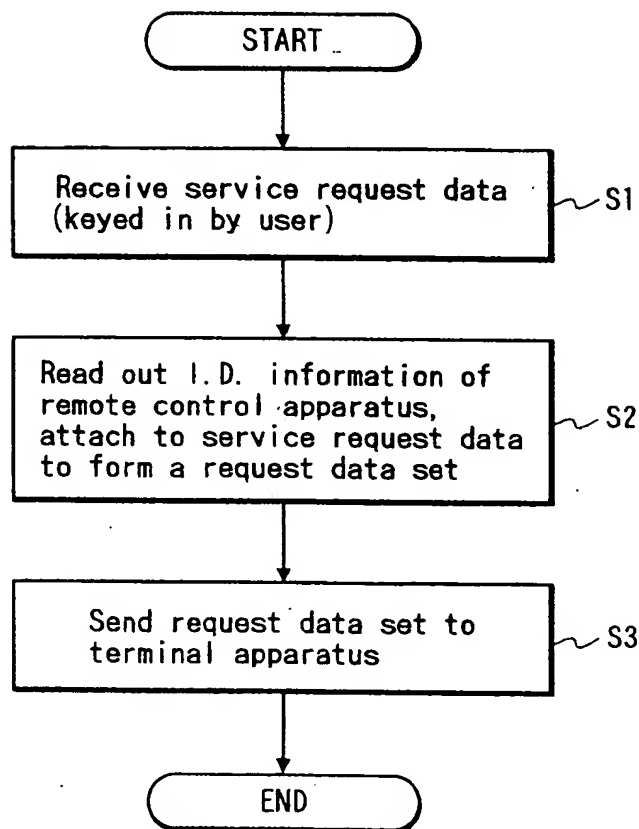


FIG. 29



*FIG. 31**FIG. 32*

*FIG. 34*



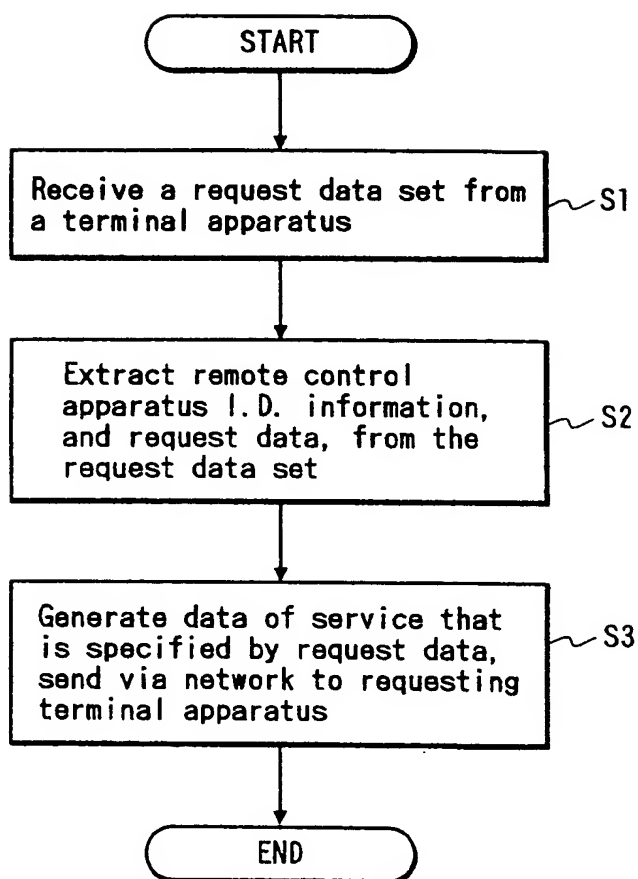
*FIG. 36*

FIG. 38A

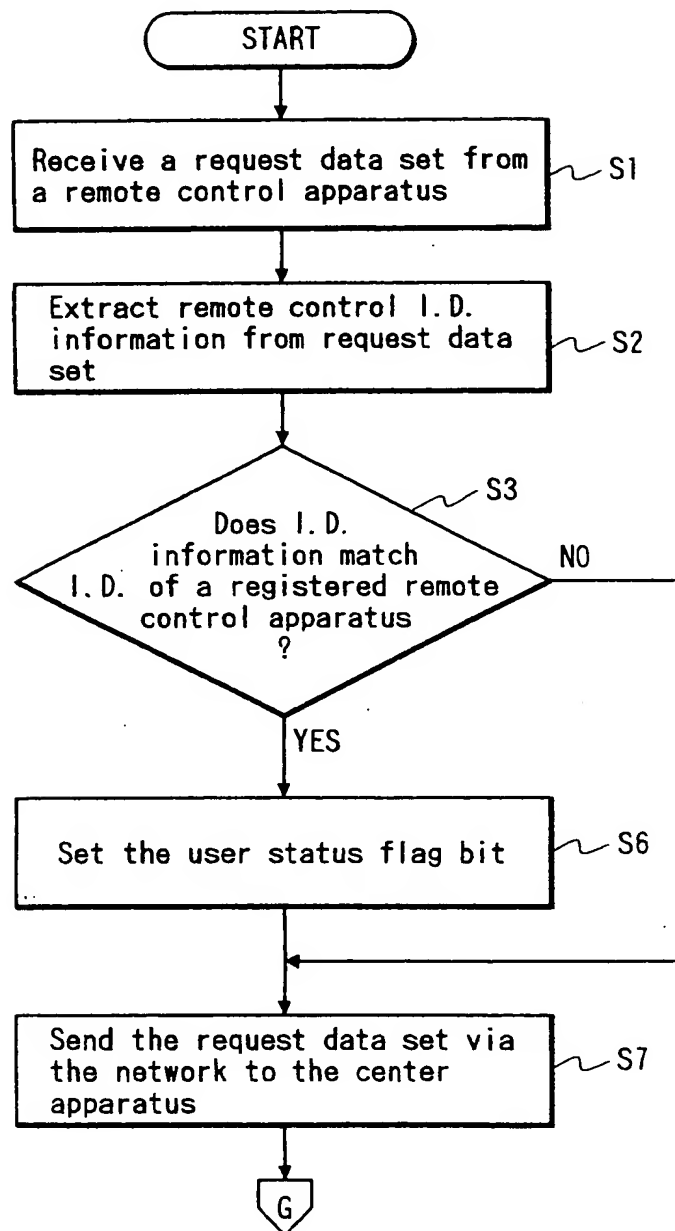
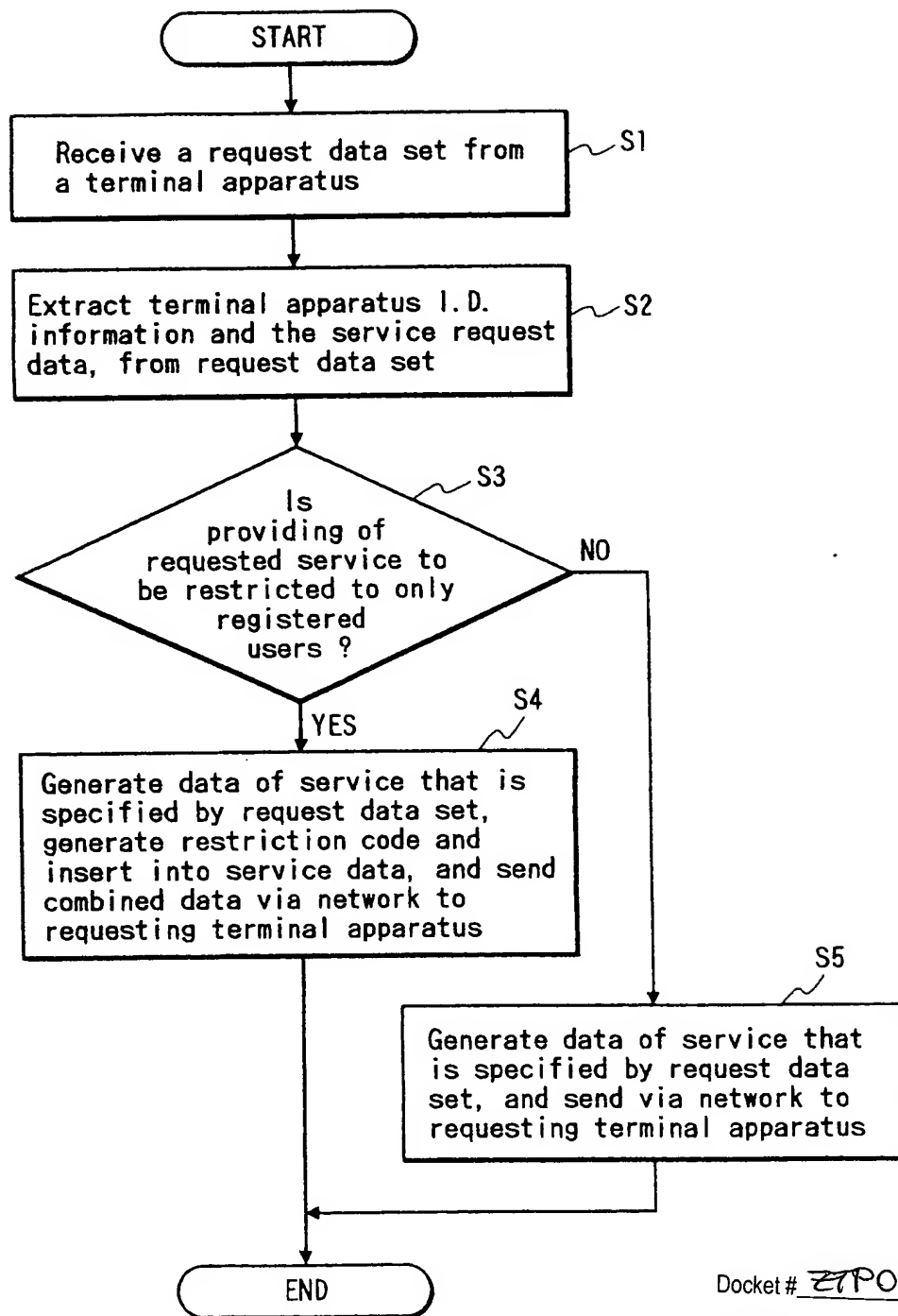


FIG. 39

Docket # EP01P18003

Applic. # \_\_\_\_\_

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